NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

STRATEGIC INFORMATION TECHNOLOGY PLAN

FY 2002 - FY 2006

Planning and Architecture Division

IT Planning and Analysis Office

Office of the Chief Information Officer

August 2002

This plan was produced in part as input to NOAA's FY 2004 Budget Process. As such, information in it may require revisions upon completion of that process. An electronic version is available at "www.cio.noaa.gov/itmanagement/spop.htm".

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PREFACE

The National Oceanic and Atmospheric Administration (NOAA) Strategic Information Technology (IT) Plan establishes a vision for how information technology contributes to NOAA's ability to accomplish the seven strategic goals identified in the NOAA Strategic Plan. It presents NOAA's requirements for IT systems in terms of these strategic goals and identifies the IT actions necessary to reach those objectives. It has a close relationship with NOAA's 5-Year Implementation Plans. This linkage in turn supports the NOAA, DOC, and OMB budget-development processes by showing how specific IT initiatives are part of an overall strategy that is essential to attain NOAA's programmatic goals. The plan integrates information on NOAA's IT programs, requirements, and issues, providing a useful management tool for tracking the general status and direction of IT management within the agency. Finally, the plan responds to Congressional and Office of Management and Budget (OMB) direction that agencies must develop strategic IT plans to ensure the sound management of this resource so crucial to Government operations.

The NOAA Strategic IT Plan identifies how NOAA is using IT to achieve its strategic goals. NOAA also prepares an annual Operational IT Plan that is integrated with NOAA's Annual Operating Plan and documents short-term plans for further actions and accomplishments. Budget Initiatives with substantial IT components are supported with additional documentation using the OMB 300 format to detail system development and management plans.

As NOAA's 5-year Implementation Plans are revised and budget decisions are made, some of the contents of the Strategic IT Plan will need adjustment. Readers should be aware that this document reflects NOAA's plans at this point in the process – the other parts of the NOAA IT planning system will document changes that would affect NOAA's specific budget requests.

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NOAA'S MISSION AND INFORMATION TECHNOLOGY ENVIRONMENT

Agency Mission

The mission of the National Oceanic and Atmospheric Administration (NOAA) is to describe and predict changes in the Earth's environment, and to conserve and manage wisely the Nation's coastal and marine resources to ensure sustainable economic opportunities. The NOAA Strategic Plan provides a framework for articulating program goals, and it establishes two mission areas: (1) Environmental Assessment and Prediction and (2) Environmental Stewardship. NOAA's mission is also described on NOAA's home page on the World-Wide-Web (http://www.noaa.gov).

NOAA's Information Technology Environment and Opportunities

NOAA is a science-based service agency. In support of its missions it collects, processes, evaluates, disseminates, and archives vast quantities of information and information products. The effective use of information technology (IT) is a critical success factor in NOAA's ability to accomplish its mission, and the use of IT is integrated into almost all aspects of NOAA's work. NOAA's Strategic Plan recognizes the critical role of environmental data and information services.

IT allows NOAA to vastly increase the amount and quality of environmental data collected. IT is an integral part of environmental data-collection systems, including radar, sonar, and satellite systems. Once collected, the data are evaluated and processed to create useful products. NOAA uses advanced computing technology, for instance, to make weather and climate forecasts. IT resources are also essential tools that NOAA uses to produce information products such as nautical and aeronautical charts and management tools such as quotas for specific species of fish.

Once produced, these information products are disseminated to the public. IT allows NOAA to provide its products to the public in a timely manner. In the case of a weather warning, "timely" means immediately through systems such as the NOAA Weather Radio system or through links to emergency management offices. Other products are disseminated in "real- time" to allow the preparation of forecasts. NOAA also serves the research community that needs reliable and responsive access to NOAA data covering extended periods of time.

NOAA uses IT to create and preserve the Nation's long-term environmental record. The Nation's ability to make informed decisions affecting the environment and the economy hinge on the integrity and completeness of environmental datasets. As NOAA collects and processes a larger volume of environmental data, the systems that archive and preserve the data for posterity must keep pace.

NOAA is a large and diverse organization linked together with a common mission. IT provides one of the links that allows the organization to operate effectively. Internal communication and collaboration are done through electronic mail and video conferencing. In addition, numerous day-to-day operations are conducted through the use of common administrative systems.

The management and use of IT are and will always be key components of NOAA's work.

NOAA strives to stay abreast of new technology by investigating and, where appropriate, prototyping technology that will improve NOAA's ability to meet its mission. Areas of technology that have been identified as having high potential benefits for NOAA include technological support for a mobile and dispersed workforce, staff development through Web-based training, and using technology to improve security.

NOAA is investing in the access and security improvements required to support telework. The National Environmental Satellite, Data, and Information Service (NESDIS) is evaluating handheld and wireless technology to support mobile workers. NESDIS and the National Marine Fisheries Service (NMFS) are investigating the use of Internet-based video teleconferencing to support a dispersed workforce.

NESDIS and the Office of Finance and Administration (OFA) are piloting a program for providing Web-based training to NOAA employees. "E-Learning @NOAA" will be launched during the summer of FY 2002. The system will be available for use throughout NOAA in FY 2003.

NESDIS is testing the use of biometric devices for access control of NOAA systems.

Technological advancements are also evaluated and implemented on a system-by-system basis. These advances are documented in the individual system reports provided later in this document.

NOAA's Current Information Technology Infrastructure

NOAA's IT infrastructure is too complex to easily summarize. Supercomputers are used to develop and use models of the environment to make predictions. Scientific workstations are often used for computationally-intensive tasks and as servers, although the increased power of PCs is leading to some change in the mix between scientific workstations and PCs. The basic desktop unit within NOAA is the PC. With the exception of efforts to plan for the use of supercomputers within the agency, decisions about the mix of computing equipment are decided by the program offices.

NOAA depends heavily on the Internet and internal networks to accomplish its goals and to disseminate information to the public. As a scientific agency, NOAA has been a government leader in the use of World-Wide-Web sites for a variety of purposes. NOAA sites are routinely accessed by the public in very large numbers, and in special situations such as hurricanes the numbers grow even larger.

NOAA is slowly moving away from internally-developed software to commercial off-the-shelf software when such a move is a viable and affordable option.

Vision for the Future

NOAA's overall mission, as expressed in the NOAA Strategic Plan, is stable and is not expected to significantly change over time. NOAA is rapidly improving the products and services provided to the public by using IT resources effectively. Thus, NOAA's IT vision focuses on finding ways to continue to use IT to accomplish NOAA's strategic goals.

In an era of stagnant or falling budgets, this vision requires that financial and staff resources be allocated carefully. Planning and decision-making must be conducted thoroughly and analytically so that resources can be directed so as to maximize the benefits to the country. Identifiable and measurable goals must be established.

NOAA has established an IT Review Board and a NOAA Chief Information Officer (CIO) Council. The role of the IT Review Board is to review and evaluate all NOAA IT investments. The NOAA CIO Council shares effective IT management practices and information and establishes NOAA-wide IT policies, procedures and practices. It also oversees NOAA-wide IT projects and operations which are funded via organizational cost distribution, and other projects as tasked by the NOAA CIO, or NOAA management.

Once investment decisions are made, NOAA's program officials must have the ability to quickly and cost-effectively implement these decisions and acquire the needed resources. Given the rate of technological change, time is of the essence when acquiring modern technology. Lengthy delays during the procurement process are burdensome and potentially costly. Where appropriate, NOAA strives to share or leverage existing resources for the common good. This includes the development of common standards-based architectures.

Managers responsible for developing new systems must have the benefit of lessons learned from past experiences. The use of "best practices" for project management and software engineering techniques for system design and implementation must be emphasized.

Finally, the performance of operational IT systems must be measured and evaluated. The goal must be continuous improvement, not the status quo.

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NOAA-WIDE INFORMATION TECHNOLOGY STRATEGIC ISSUES AND GOALS

NOAA's leadership recognizes the importance of IT as an enabler that allows NOAA to accomplish its mission. IT is critically important to NOAA's ability to accomplish each of its seven strategic goals. The individual systems being planned, deployed, or operated to accomplish these goals are described later in this plan. However, IT also needs to be managed at the enterprise level. Over-arching issues and management requirements exist and must be addressed for the organization as a whole.

This section of NOAA's Strategic IT Plan describes these management issues, provides a status report on NOAA's progress in dealing with them, and outlines NOAA's plans for dealing with each issue.

Information Technology Architectures

Description: NOAA's Information Technology (IT) Architecture (ITA) includes the following enterprise architectures: business processes, data sets and information flows, applications and software portfolio, and technology infrastructure. The NOAA ITA is based on standards and principles that allows the translation of the NOAA Strategic Plan into Capital IT Investments and the acquisition and implementation of new and upgraded IT systems. NOAA's ITA is comprised of an Enterprise Architecture and a Technical Reference Model and Standards Profile.

Status: The NOAA ITA is comprised of Line Office and of cross-cutting domain Architectures as follows:

- Administrative Systems
- Archiving and Access
- IT Security
- High Performance Computing
- Messaging/Directory Services
- Shared Telecommunications and Networking
- National Environmental Satellite, Data and Information Service (NESDIS)
- National Marine Fisheries Service (NMFS)
- National Ocean Service (NOS)
- National Weather Service (NWS)
- Office of Marine and Aviation Operations (OMAO)
- Office of Oceanic and Atmospheric Research (OAR).

NOAA created an IT Architecture Working Group (AWG) in August, 1999. The Group reports to and follows the guidance of the NOAA CIO Council, and serves as a NOAA-wide forum for addressing issues related to the implementation and use of IT Architecture as a strategic information management practice. A NOAA AWG Home Page was established to enhance communications between NOAA AWG members and the various IT Architecture domain and

segment teams. The URL for the NOAA AWG Home Page is www.hpcc.noaa.gov/noaaita (access is restricted). During this past year, the NOAA AWG investigated and reported to the NOAA CIO Council the following issues:

- The establishment of Office Automation standards that can be adhered to by all in NOAA.

- The minimum requirements for a NOAA-wide remote access policy to protect NOAA's IT infrastructure from associated threats and the development of an IT policy. implementing remote access.

NOAA conducted an Enterprise Architecture Maturity self-assessment in the third quarter of 2001. The self-assessment showed that the NOAA-wide IT Architecture Capability Maturity to be at Level 2.15, with Level Zero being the least mature and Level Five being the most mature. The self-assessment indicated that NOAA is most mature in the early phases of the IT Architecture Process and is least mature in the later stages of the process. Analysis of the assessment rankings reflects NOAA's maturity in the development of the IT Architecture process, the Architecture linking to NOAA's business, the early involvement and acceptance of the process by NOAA's IT senior management, and the participation of the Line Offices in the Architecture process. As NOAA continues to gain experience with the IT Architecture process, NOAA expects to strengthen its IT Architecture Governance structure, to better integrate the IT Architecture process with NOAA's IT Investment and Procurement Strategy, and to better communicate the IT Architecture and its process to all levels of the organization.

The first revisions to NOAA's IT Architecture plans were submitted to the DoC OCIO in June, 2001. Next updates to the IT Architecture domains and segments plans are due in the fourth quarter of 2002.

The NESDIS ITA is developed based on priorities and funding. NESDIS intends to validate its Target Architecture by performing focused independent studies on specific domain areas (Product Generation, Command and Control, and Networking). NESDIS implemented a program for continuous self-assessment of its Enterprise Architecture to ensure it's ability to mature and improve in the future. NESDIS has instituted a governance mechanism and organization, the NESDIS Information Technology Architecture Team (ITAT), which is focused on Enterprise Architecture issues.

NOAA Fisheries (NMFS) was an early proponent of IT Architecture. Overall the NOAA Fisheries architecture is well defined and communicated and the process is largely followed. The Gap Analysis, Migration Plan, Technical Reference Model, Standards Profile, and Migration Plan have been completed and are being revised to reflect the aforementioned process. Building on the basic components of IT Principles, Policies and Best Practices, NOAA Fisheries is maturing and streamlining the architecture and the associated capital planning and review processes.

The National Ocean Service (NOS) has incorporated the yearly IT Operational Plan into the architecture process using the submissions as the near-term Target Architecture and Migration

Plans. Currently, NOS is collecting information for a more comprehensive baseline of all layers of the Architecture. The next step is to more thoroughly compare the baseline with the target and perform gap analyses to assist the offices in their planning for upcoming budget cycles.

The National Weather Service (NWS) submitted a second revision to its IT Architecture Plan in July, 2002. The National Weather Service's Information Technology Architecture (ITA) represents NOAA's single comprehensive approach to providing accountability for its technology investment. This single source for consistent planning encourages managers and planners to focus on the mission of the enterprise rather than specific programs or customers.

The Office of Oceanic and Atmospheric Research (OAR) IT Architecture was completed in April, 2002, with the submission of the implementation plan. OAR considers its architecture to be a "living" document. It needs to be monitored and revised to reflect changing requirements and advancing technology. The IT Architecture has been an important part of the OAR senior IT personnel's managerial focus. With OAR sites as geographically dispersed as they are, and with diverse missions, participation from Senior IT Managers has been crucial. OAR plans to continue to improve its Architecture Capability Maturity Model rating in all areas. Now that the entire architecture has been characterized, and the migration/implementation plan complete, areas other than the architecture document and infrastructure can be emphasized and improved.

OFA is updating its baseline architecture to reflect acquisitions and modifications made over the past two years.

Future Direction/Actions: NOAA will update the NOAA Line Office and Domain IT Architecture Plans on an annual basis, as necessary.

NOAA will strive to continuously improve its IT Architecture Plans in accordance with the Department of Commerce IT Architecture Maturity Model.

NOAA will align its ITA with NOAA's Strategic Plan and IT Investment and Acquisition Strategy and with the Department of Commerce's e-Government initiatives.

NOAA will use an interactive Enterprise Architecture Modeling toolset to facilitate the alignment with Strategic Plan and IT Investment and Acquisition Strategy. As part of the selection process, NOAA will first pilot the selected EA toolset with one of the Line Offices.

Finally, NOAA will continue to strive to begin to implement the Department of Commerce IT Architecture Capability Maturity Model as part of its IT governance in order to enhance the overall odds for success of the IT Architecture by identifying weak areas and providing a defined path towards improvement.

ITA Milestones	FY Goal	Completion or Revised Goal
NOAA IT Architecture Plans Submitted to Dept. of Commerce IT Architecture Affinity Group	FY 00	FY 00
Drafted NOAA Technical Reference Model and Standards Profile	FY 01	FY 01
Revised and updated NOAA IT Architecture Plans	FY 01	FY 01
Line Offices conduct and submit IT Architecture Capability Maturity Level self-assessments	FY 01	FY 01
Revised and updated NOAA IT Architecture Plans submitted	FY 02	
Line Offices conduct and submit IT Architecture Capability Maturity Level self-assessments	FY 02	FY 02
Pilot and select an interactive Enterprise Architecture Modeling toolset	FY 03	
Use an interactive Enterprise Architecture Modeling toolset to facilitate the alignment with Strategic Plan and IT Investment and Acquisition Strategy.	FY 03	
Line Offices conduct and submit IT Architecture Capability Maturity Level self-assessments	FY 03	
Revise NOAA Technical Reference Model and Standards Profile	FY 03	

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Information Technology Security

Description: The NOAA-wide IT Security Program is a broadly-based, decentralized program that relies on Line and Staff Office participation, partnership, and enforcement. The objective of the program is to protect the integrity, availability, and confidentiality of NOAA's sensitive systems and data, including 375 systems for which security plans have been developed. The IT Security Office also includes the NOAA Computer Incident Response Team (N-CIRT) that has responsibility for the prevention, identification, containment, eradication, recovery, and follow-up of incidents and the maintenance of evidentiary chains.

The nature and complexity of security threats is increasing due to dynamically expanding use of networks to accomplish program objectives and the insufficient technical staff and resources to maintain continuity of important initiatives. NOAA's ability to perform its mission as a

scientific information agency has grown as a direct result of technological changes. But at the same time, as the business model shifts to one built on remote automated information dissemination, the criticality and complexity of protecting on-line resources has also increased. The sort of corollary security responsibility that has been our model of operation in the past is no longer viable in many circumstances. Improperly configured and maintained host systems can be compromised and provide hackers with internal network configuration information and specifics concerning users. The Defense in Depth layered approach to IT security suggests that the use of properly configured firewalls, intrusion detection software, penetration testing, and other tools, may help reduce risks associated with misconfigured systems.

Statutory requirements for this program are derived from the Computer Security Act of 1987, (Public Law 100-235); the Government Information Security Reform Act; the Office of Management and Budget Circular A-130, "Management of Federal Information Resources"; and the A-130 Appendix III, "Security of Federal Automated Information Resources". NOAA Administrative Order 212-13, "Information Technology Security Management", explains the roles and responsibilities of individuals and organizations involved in computer security within NOAA.

In addition to the formal requirements dictated by OMB, the program is based on security awareness training and information dissemination, risk assessments, formal security site reviews, corrective actions, and technical support. The core of OMB requirements apply to each system and include a formal security plan, risk assessments, contingency plan, system certification and accreditation, and verification reviews.

Security awareness training is provided through new employee and manager training, seminars, publications including an annual bulletin, and conferences. Information dissemination includes: topical workshops, a NOAA Security Web page, security alerts, quarterly meetings among security officers, coordination with other Federal agency security officers, and publications such as the IT Security Planning Guide. Risk assessments and corrective actions occur through formal site reviews and independent technical evaluations (e.g. the National Security Agency, Lawrence Livermore Laboratory, and authorized in-house staff). To further support these activities, NOAA has assembled suites of software for protecting systems (commercial anti-virus and security planning software, public-domain Internet tools), and performs periodic security assessments of critical systems. NOAA's procurement of, and development of specific requirements for, a software package has benefitted system owners in creating, maintaining, and tracking IT security plans.

The NOAA IT Security Office has oversight and development responsibilities for the NOAA-wide Critical Infrastructure Protection Program for Presidential Decision Directive (PDD)-63 critical assets. This includes the identification of PDD-63 assets, vulnerability assessments of critical asset systems, and identification and remediation of corrective actions.

Status: The principal measure of the success of computer security in NOAA is the degree of awareness and commitment exhibited by its system administrators and end users, i.e., detecting and reporting incidents, network monitoring, and taking corrective actions for technical or

operational controls due to security assessment reviews. Although that commitment is hard to quantify, there have been a number of noteworthy accomplishments.

Since the establishment of the NOAA Computer Incident Response Team (N-CIRT), a security technical staff (STS) has been appointed. The STS is usually the system administrator. The STS performs scans on networks for vulnerabilities and provides reports on all reported incidents. The N-CIRT coordinates incident responses and is responsible for acting as a source of expertise and information regarding vulnerabilities and responses as pertains to the NOAA environment.

The NOAA IT Incident Reporting Form 47-43 has been updated and was tested before going on-line. The form was revised for better reporting of all incidents, (e.g. intrusions and viruses) and now uses the NOAA LDAP directory. Line Office IT Security Officers (ITSOs) receive reports from their offices, so they have knowledge of the type and number of vulnerabilities within their Line Office.

The NOAA computer security Web site has been revised and is available to NOAA users for retrieving the latest security patches, alerts, news, and other services.

The N-CIRT uses the Internet Security Systems (ISS) Internet Scanner to perform vulnerability scanning on NOAA networks and ISS Real Secure to perform intrusion detection scanning.

The N-CIRT has established a program to allow it to scan networks for potential vulnerabilities on an as-required basis or when requested by responsible Line Office CIOs.

The NOAA Office of the CIO Network Operation Center's firewall is in place. Networks have been placed behind the "firewall" as requested. A written agreement for each network behind the "firewall" has been established.

As part of NOAA's information security awareness program, NOAA implemented the second Web-based security awareness training course. The course is mandatory for all NOAA employees, contractors, and temporary employees. The course provides refresher security awareness training to NOAA personnel to facilitate appropriate protection of NOAA's information assets. The course is designed to address the widest possible audience. The features include references and contacts, a quiz at the end of the course to provide immediate feedback, a request for course evaluation with responses sent by e-mail, course completion registration sent by e-mail, and a certificate of completion. In June 2002, NOAA certified to DOC that 100% of NOAA employees and contractors (on board at that time) had taken the FY 2002 security awareness course.

An IT Security Program overview is provided during new employee orientations. New employees are informed during the orientation that the Web-based IT security awareness course must be completed within three days.

The NOAA security awareness bulletin, *Frontline*, is published quarterly, as an awareness training tool.

The NOAA's Annual IT Security Conference was held on December 5, 2001. The conference theme was Homeland Security and included the following presentations: *Homeland Security - What More Can We Do?, Cyberterrorism: An Update on the Latest Threats by a Nationally Known Expert,* and *Bringing the Threat Home.* Vendor exhibits were also provided.

SANS on-line IT security training is now required for all network and system administrators. This Web-based training is sponsored by the NOAA IT Security Office, and is being conducted under contract by the SANS Institute. 772 system and network administrators have registered for the SANS Security Essentials class.

Vulnerability assessments were conducted by the National Security Agency on the National Hurricane Center and Tropical Prediction Center in November 2001 and the Geophysical Fluid Dynamics Laboratory in October 2001. Corrective action plan reports were completed and included findings, actions to be taken, and completion dates or anticipated completion dates.

100% of NOAA systems were assessed using the NIST self-assessment methodology. The NIST self-assessment methodology is now required by OMB for agencies to use when reporting on implementation of the Government Information Security Reform Act.

Plans of Actions and Milestones (POA&Ms) were completed for all systems with identified weaknesses. These POA&Ms served as the basis for NOAA's quarterly GISRA reports to DOC. The quarterly GISRA reports included the total number of weaknesses: (1) identified on the original POA&Ms, (2) for which corrective action was completed on time, (3) for which corrective action was ongoing or on track to complete as originally scheduled, (4) which were delayed, and (5) identified as new weaknesses following the last POA&M or status update.

Information and documentation was provided for two DOC-level reviews of the NOAA IT Security Program. The first review was by the DOC Office of Inspector General (OIG) to measure NOAA's implementation of the GISRA. The review included meetings with upper-level management to determine the NOAA Administrator's, NOAA CIO's, and Line Office CIOs' focus and direction on IT security. The OIG is now reviewing security documentation (security plans, risk assessments, contingency plans, testing documentation, and accreditation statements) for 24 NOAA systems. The second review was a compliance review by the DOC IT Security Office. The review is ongoing and is focusing on the NOAA-level IT Security Program as well as system-level reviews of one general support and two major application systems.

The NOAA ITSOs have meet with the Critical Infrastructure Assurance Office's (CIAO) Project Matrix Team and initiated the process for upcoming Project Matrix reviews. The CIAO provided a briefing to the NOAA ITSOs and two CIAO representatives discussed each Line Office's IT systems inventory list to determine if a system was PDD-63 or mission critical. From this meeting, NOAA had a draft list of 36 IT systems that may be identified as candidates for Project Matrix reviews. The CIAO's Deputy Director of Project Matrix provided a briefing to the NOAA CIO Council on June 27, 2002. The CIOs were informed that an information asset and evaluation (IAE) will be completed for each of the 36 systems identified as candidates. After the IAE on each system, NOAA will have a final list of PDD-63 systems.

NOAA IT Security Program policies are in the process of being updated and new policies have been developed. A comprehensive draft IT Security Manual has been developed to pull together all NOAA IT security policies into one central location. The draft IT Security Manual will be provided to the Line Office CIOs and ITSOs for final review and comment in September 2002.

Future Direction/Actions: Future milestones and goal dates are provided in the chart below.

Milestones	FY Goal	Completion/ Revised Goal
Security Plans Reviewed and Updated.	FY 02	Annually
Accredit NOAA IT Systems every three years.	FY 02	FY 05
Update IT Systems Inventory.	FY 02	Annually
772 registered system and network administrators complete all modules of the SANS training program.	FY 02	Ongoing
Perform vulnerability assessments on 3 major critical systems.	FY 03	
Complete review of TS2000 and other software packages for ease of use and cost. • Develop SOW for software package changes. • Implement new software package.	FY 02 FY 02 FY 02	FY 02
Implement the updated NOAA-wide Web-based security awareness tutorial. • All NOAA employees complete 2002 Web-based security awareness training.	FY 02	FY 03 FY 02
All employees complete annual awareness training.	FY 02	Annually
FY2002 GISRA Reporting: • Provide GISRA Report to DOC. • Provide GISRA Plans of Actions & Milestones for FY2002 Identified Weaknesses.	FY 02	Annually
NOAA IT Security Manual. • Complete draft NOAA IT Security Manual and send to LO's for comments. • Finalize NOAA IT Security Manual.	FY 03	
Start the development pilot project with already existing Intrusion Detection Software (IDS) at NOAA's major sites.	FY 02	Ongoing

Milestones	FY Goal	Completion/ Revised Goal
Provide specialized UNIX training for system and network administrators.	FY 02	
Develop formalized incident response procedures for UNIX.	FY 02	FY 02
Create an automated patch management capability for NOAA systems. • Deploy Redhat Linux autorpm. • NOAA pilot for Patch Authentication and Dissemination Capability (PADC).	FY 03	

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Government Paperwork Elimination Act and Reducing Public Reporting Burden on the Public

Description: The Government Paperwork Elimination Act (GPEA) requires that by October 2003 Federal agencies offer, when practicable, electronic options for all transactions with individuals and entities that deal with the agency. OMB Memorandum M-00-10 required agencies to submit plans by October 2000 for how they will achieve these goals.

The GPEA closely ties in with Paperwork Reduction Act (PRA) requirements to use IT to reduce the reporting burden on the public, and this section addresses both efforts. It also ties in with broader "Electronic Government" efforts, which are addressed as a separate issue below.

Status: NOAA submitted an updated GPEA Plan to the Department of Commerce in October, 2001. This plan is being updated for resubmission in October, 2002. Copies of the Plan and other GPEA documents can be found at www.cio.noaa.gov/itmanagement/gpea.htm. NOAA's individual Line Offices continue to work on the individual projects outlined in the Plan.

NOAA's GPEA progress provides strong support to several of the Federal government's E-Government initiatives. The National Environmental Satellite Data Information Service (NESDIS) electronically provides essential geospatial data for the Geospatial One-Stop initiative. The National Weather Service (NWS) forecast products on the Web are linked with the Recreation One-Stop initiative. The Office of Finance and Administration is re-engineering its grants management process to utilize the E-Grants portal when it becomes operational. The National Marine Fisheries Service (NMFS) is deploying e-Comments in support of the Online Rulemaking Management initiative. NOAA is actively engaged in establishing a Public Key Infrastructure in support of the E-Authentication initiative. And NOAA is an active partner in the Disaster Assistance and Crisis Response initiative (E-Disaster).

Beyond supporting the 24 specific E-Government initiatives, NOAA has a strong presence in the world of Web-based government and it is transforming information transactions with all of its customer groups. NOAA's Web sites are consistently among the top ten sites being accessed by the public. NOAA is constantly improving how it uses the Internet to carry out its various missions. For example, NWS has simplified and unified its corporate Web presence, establishing a common look and feel that substantially improves navigation and usability for its citizen, business, and government customers and resulting in a three-fold increase in accessibility.

NMFS has established a Web-based permitting process to better serve its customer base of commercial fishermen. NESDIS's three National Data Centers have created an e-commerce site, vastly simplifying the purchasing of its environmental data, reducing the number of contractor staff, reducing time to send archived data to customers, and increasing the volume of data provided. NWS has transformed registration for conferences with its partners, going from a paper-based to a Web-based electronic transaction.

NOAA has continually improved its internal efficiency and effectiveness through electronic transformation. NWS has significantly improved the efficiency and effectiveness of one of its mission activities (creating and issuing forecasts, watches, and warnings) by implementing the Advanced Weather Information Processing System. Forecasts and information that used to be created and communicated on paper charts now are developed and flow electronically to forecasters and customers, increasing timeliness and accuracy. NOAA also electronically transfers to the Finance Office invoices received electronically from telecommunications vendors. On an even larger scale, NOAA CAMS is transforming several aspects of NOAA's financial management, including travel and credit card transactions.

Future Direction/Actions: A key component of NOAA's E-Government strategy is targeting barriers to E-Government success. The lack of a current, operational Public Key Infrastructure (PKI)/E-sign infrastructure is a major barrier to possible initiatives serving any or all of the E-Government customer groups. Many of NOAA's opportunities to advance the goals of the E-Government element of the President's Management Agenda and the GPEA require electronic signatures. So NOAA is actively involved in advancing the development of the infrastructure required for electronic signatures. A NOAA-level Certificate Policy (CP) is being developed, modeled on the CPs of agencies preparing for cross-certification with the Federal Bridge. The intent is that this CP will serve most or all needs for Certificate Authorities (CA) within NOAA, assuring interoperability within NOAA, with other elements of Commerce, and with the Federal Bridge and its community. NOAA expects to have its CP ready by FY 2003, and a CA under this CP in operation by that time for inter-operation with NASA and one or more NOAA/NASA contractors.

NOAA participates in interagency planning work toward interoperability among separate PKI domains (within the government and with non-Federal entities) to leverage the experience and efforts of other agencies, and to reduce barriers to implementation. The interagency work includes membership on the Federal PKI Steering Committee and NOAA's participation in the E-Authentication Initiative.

Other activity where NOAA's GPEA and E-Government strategies reinforce one another are:

1. NOAA has started a pilot PKI project for secure email and secure Web-based business processes.

2. NOAA has contributed to PKI-specific Records Management guidance to be published in November 2002 by the Federal CIO Council and the National Archives and Records Administration. NOAA is analyzing the Records Management components of its business processes that will accompany their transformation.

3. NOAA is continuing general efforts to identify internal and external business processes which could utilize electronic signatures in the process of conversion and re-engineering.

The NOAA National Marine Fisheries Service (NMFS) is undertaking an initiative to re-engineer and streamline its business processes that involve collecting a wide variety of information from the citizen, business, and government communities. NMFS will develop one or more event-driven portals which will enable constituents to transact business with the agency that currently must done with several different regional offices. The first step in the overall initiative will be to offer all NMFS' Paperwork Reduction Act (PRA) related forms for completion online, thus satisfying the minimum GPEA requirement. The increased benefit will accrue from the more favorable economy of scale, more efficient management, and easier access by the community of commercial fishermen served by NMFS. Examples of concrete progress in this transformation process is highlighted on http://www.commerce.gov/egov.html.

NOAA's general GPEA strategy is to pursue efforts that present the best opportunities for a positive return on the investment, specifically:

1. Choosing areas that can be significantly improved by automation, such as the turnaround time for grants, immediate data access for hazardous materials response, and increasing the frequency of updates to widely-used charting products;

2. Focusing on emergency services to the public, such as implementing an electronic Vessel and Aircraft Beacon Registration process that gives individuals and the ship, boat, and aircraft industry an electronic means of registering emergency beacons; and,

3. Connecting to electronic processes already put in place by other governmental entities. For example, NOAA's Acquisition Office is using the Government's FedBizOpps single e-procurement portal to access notices of solicitations over $25,000, ahead of the President's Management Agenda target date of the end of 2002.

Milestones	FY Goal	Completion/ Revised Goal
NOAA Certificate Policy (CP) ready	FY 03	

Milestones	FY Goal	Completion/ Revised Goal
NOAA Certificate Authority under CP ready for inter-operation with NASA and one or more NOAA/NASA contractors	FY 03	
Update NOAA GPEA Plan	FY 03	

Contact Point: David McClure (301-713-3555, ext. 211)

Compliance Strategies for Section 508 of the Rehabilitation Act Amendments of 1998

Description: Section 508 of the Rehabilitation Act, as amended in 1998, requires that Government agencies ensure that electronic information technology (EIT), including computers, software, office equipment, telephones, and multimedia productions, that are purchased or produced be accessible to people with disabilities. This law is being implemented by requiring that agencies comply with published accessibility standards. NOAA has undertaken many activities aimed towards fully implementing the Section 508 standards.

Status: NOAA has responded to the accessibility requirements by taking actions in the following areas.

Awareness: NOAA established a Section 508 working group to initially focus on promoting Section 508 awareness and developing an inventory to determine the magnitude of the problem. In FY 2001, the NOAA Section 508 Website http://www.section508.noaa.gov/ was implemented. This is the official NOAA Section 508 Website with a comprehensive listing of information pertaining to Section 508, including a clear explanation of the law, government-wide and NOAA policies, and key definitions and procedures, as well as resources for purchasing and developing 508-compliant electronic and information technology.

In FY 2002 the NOAA Section 508 Electronic Information Technology (EIT) Working Group prepared a booklet, "A Practical Guide to EIT Accessibility through Section 508". This booklet provides an overview of the laws and regulations that affect NOAA users, as well as NOAA-specific information.

Compliance review and reports: Section 508 requires that the Department of Justice (DOJ) is responsible for reporting every two years on the extent to which electronic and information technology is accessible to individuals with disabilities throughout the Government. DOJ decided to initially focus on the accessibility of federal agencies' Web sites. NOAA's Working Group, including three visually impaired employees using screen-reading software, found that most sites were accessible and that the problems that did exist could be fixed with only minor modifications. This team continues to test NOAA Web sites for accessibility on an as-requested

basis and provides guidance to Web developers on ways to improve the accessibility of their sites.

Procurement Policy Revision: In June 2001, NOAA procurement policies were revised to incorporate the new Federal Acquisition Regulations requirement for Section 508 Standards. A determination as to whether or not Section 508 applies must be made for each procurement. When Section 508 does apply, a checklist is completed to determine whether the applicable Accessibility of Electronic and Information Technology Standard is being addressed. If Section 508 does not apply, an exemption must be cited.

Future Direction/Actions: NOAA's goal is to use information technology to make information, programs, and services accessible for people with disabilities. NOAA will be working in the following areas to improve the accessibility of its information and its information technology.

Awareness: NOAA will continue to provide training on the Electronic and Information Technology Accessibility Standards to IT personnel, procurement staff, help-desk personnel, and Web masters. NOAA employees will be encouraged to use the many training modules described on the GSA Section 508 Web site. The existing exemption for credit card purchases under $2,500 is currently scheduled to expire on Jan 1 , 2003. If this expiration date is not changed, NOAA will assist purchase card holders in understanding their responsibility for ensuring that only accessible products are purchased.

Assessment/Validation: NOAA will continue to annually certify Web site accessibility.

Implementation: NOAA will continue to ensure that accessibility issues are addressed in the planning for the design, development, and procurement of IT.

Milestones	FY Goal	Completion/ Revised Goal
NOAA's procurement policy and regulations revised to incorporate the new FAR regulations for Section 508 standards.	FY 01	FY 01
Procure **only** electronic and information technology that is accessible to people with disabilities.	FY 01	FY 01
Submit second Bi-annual Section 508 Report - Degree of Accessibility of Electronic and Information Technology: focus - Federal Agencies Web sites.	FY 01	FY 01
Renovation of NOAA Web sites for Section 508 accessibility.	FY 02	FY 01
Programs offered on NOAA Internet and Intranet sites are Section 508 accessible.	FY 03	FY 01

Milestones	FY Goal	Completion/ Revised Goal
Training on the Section 508 standards to IT, procurement, and human resource personnel.	FY 03	FY 01
Submit Bi-annual Section 508 Report - Degree of Accessibility of Electronic and Information Technology and the resolution of Section 508 complaints filed against NOAA (April 2003).	FY 03	
Submit Bi-annual Section 508 Report - Degree of Accessibility of Electronic and Information Technology and the resolution of Section 508 complaints filed against NOAA.	FY 05	

Contact Point: Natalie D. B. Smith (301-713-3525, ext. 213)

Electronic Government

Description: The provisions of many Federal statutes, especially the Government Paperwork Elimination Act (GPEA), establish a broad and general obligation on the part of Federal agencies to make government information electronically available to the public in an effort to improve the productivity, efficiency, and effectiveness of Federal programs.

Status/Future Direction/Actions: The status of NOAA's E-Government initiatives is outlined by organizational group in the discussion below.

NMFS

Overview: NOAA Fisheries has been on the forefront to provide e-Government applications to the public. As NMFS moves forward, plans are to more strategically and systematically apply resources to E-Government solutions. Successful solutions include: the Bluefin Tuna Permits site that was recognized and lauded nationally by private-sector IT leaders as a prime example of government e-commence applications, and a Northwest Region Groundfish e-permitting system enabling fishermen participating in that fishery to renew their permits simply by getting on-line and responding to questions on the screen. Another example of commitment to electronic government solutions includes a Web-based Permit Consultation Tracking System for Section 7 Endangered Species Act consultation actions in the Northwest Region. The successful implementation of this application has dramatically improved the inter-agency consultation process in this region. By early FY 2003, NOAA Fisheries will develop a schedule for electronic consultations to be in effect throughout the Agency. NOAA Fisheries is currently deploying E-comments, an application designed to receive and post public comments online. This application engages constituents directly in rule-making using the Internet for the first time and will enable Fisheries to process comments more effectively and ultimately enhance

overall rule-making process. This system will serve as a cornerstone for an electronic docket application.

However, there are insufficient resources to accomplish all of the goals and initiatives requested by management and stakeholders. Therefore collaboration with similar mandates, both inside and outside of NOAA Fisheries, will seek new ways to work to achieve mutual aims. New partnerships and collaboration will advance E-government solutions across NOAA.

Public Consultation Tracking System: NOAA Fisheries is continuing to enhance its Public Consultation Tracking System (PCTS). The application began as an effort to provide constituents with an electronic means to review the status of Section 7 permit consultations in process between NOAA Fisheries and the Corps of Engineers. This system was piloted in the Fisheries Northwest Region, and had a major impact in improving outreach efforts to constituents. The pilot has been such a success that it is currently being expanded to include consultations with a variety of external agencies such as the US Forest Service, Bureau of Land Management, and the Federal Highway Administration. This system will be expanded to other NOAA Fisheries Regions after implementation is completed in the Northwest Region. Implementation of this E-government initiative will significantly improve ability to provide up-to-date information to businesses and to citizen and constituent groups regarding the government-to-government consultation processes.

Electronic Rule-making: In response to the President's E-Government initiative for online rule-making, NOAA Fisheries is deploying e-Comments as an initial step to implementing full electronic rule-making. E-Comments will provides a Web site for the public to submit comments on proposed rules and other Federal Register notices electronically. An initial pilot for the system accepted comments on one proposed rule at Headquarters in FY 2002. NOAA Fisheries will expand the pilot to additional Financial Management Centers in FY 2003. NMFS' ultimate vision is to establish an electronic docket, electronic dialogues with the public, and internal and external rule-making portals. NOAA Fisheries is working closely with the Department of Transportation, the managing partner for the President's online rule-making initiative, to reuse as much available technology as possible and to avoid building redundant systems.

One-Stop Electronic Permits: The purpose of this project is to provide an opportunity for both the commercial and recreational fishing industry to use a Web-based customer-service platform, where fishermen can obtain information and perform routine permitting transactions on their own. NOAA Fisheries will conduct a requirements-gathering effort with the Northeast Regional Office to identify key permitting activities used for authorizing Commercial Seafood Dealers in the Northeast and Southeast Regions. Based on the requirements, NOAA Fisheries will develop a permits application and use it as a basis for a common One-Stop permits environment in the Northeast Region. The application would be accessed through a portal linked to the NOAA Fisheries Home Page. An assessment of the adequacy of this application will be conducted and the technology will be made available to other Regions for the development of permitting applications, all of which would eventually be accessible via the NOAA Fisheries home page.

Groundfish Permits: NOAA Fisheries has developed and implemented an electronic permit renewal and payment system for the Northwest Pacific Coast Groundfish Limited Entry Program. This system went on-line September 1st 2001 to coincide with the annual Pacific Coast Groundfish permit renewal season. This application allows individuals and businesses to pay groundfish permit fees with a credit card using a NOAA Fisheries Web site. NOAA Fisheries worked with the Department of the Treasury Financial Management Service and the Bank of America to develop and implement the system. In an effort to promote federal e-payment systems, Treasury has provided an "off-the-shelf" product free of charge, and is assuming liability for credit card security. Permit holder information is gathered at the NOAA Fisheries web site, and the encrypted transaction is passed to a Treasury Web site to process credit card information. The successful implementation of the Groundfish Permit Renewal E-Payment System has served as "proof of concept" for other e-pay sites at NOAA Fisheries

Marine Mammal Stranding: The Marine Mammal Health and Stranding Response Program (MMHSRP) was established under Title IV of the Marine Mammal Protection Act. NOAA Fisheries has collected basic data on marine mammal strandings from authorized respondents during the past twenty years. Stranding data provides valuable descriptive information essential for NOAA Fisheries conservation and management decisions. Additionally, as protected resource issues become increasingly important in the context of fishery management, it is necessary that this information be standardized and available in electronic format. NOAA Fisheries is often asked by constituents and members of Congress for nationwide stranding statistics and trends. The MMHSRP database will standardize data collection and management by establishing a national marine mammal database that includes the content of existing regional databases, and brings them together in a common compatible format, utilizing a single, centrally located database. This will allow NOAA Fisheries to better archive stranding data as well as to compare data between the regions, and efficiently query and analyze stranding data.

NESDIS

The GeoSpatial One-Stop: This is a part of the new OMB E-Government initiative to improve the effectiveness, efficiency, and customer service throughout the Federal Government. The long-term vision for GeoSpatial One-Stop is that it will revolutionize E-Government by providing a geographic component for use in all Internet-based E-Government activities across local, state, tribal, and Federal government. The implementation of the GeoSpatial One-Stop in the near-term will:

- Provide standards and models for the GeoSpatial framework data content;
- Provide an interactive index to GeoSpatial data holdings at the Federal and non-Federal levels;
- Initiate interaction between Federal, state, and local agencies about existing and planned spatial data collections; and
- Provide an online access point to GeoSpatial data.

Project Summary – The overall plan for GeoSpatial One-Stop is documented in its Capital Asset Plan located on the Web at http://fgdc.gov/geo-one-stop/docs/one_stop.pdf. Over the past few

decades, the computer has made geographic information about the natural world and its inhabitants much more useful to government, businesses, and communities for making critical decisions. Geographic information systems (GIS) allow users to integrate, analyze, and manage information about GeoSpatial data in ways never before possible. *GeoSpatial data* identifies the geographic location and characteristics of natural or constructed features and boundaries on the Earth. The Federal Geographic Data Committee (FGDC) will lead the GeoSpatial One-Stop project to define and build national consensus on content of a geographic data framework. The data from this framework will be consolidated into the National Spatial Data Infrastructure (NSDI) Clearinghouse network providing "one-stop" access to FGDC-compliant GeoSpatial data. Interoperability tools, which allow different information communities to share data, will be utilized to migrate current data to the FGDC-endorsed NSDI Framework Data standards. The project will test and evaluate a Web portal as an extension of the NSDI Clearinghouse network. Based on the results, a comprehensive Web portal will be developed and deployed for "one-stop" access to standardized GeoSpatial data. After initial deployment and testing of the comprehensive Web portal, reusable, commercial replication services (24X7, trusted data services) will be required.

The GeoSpatial One-Stop builds upon existing capabilities to accelerate the development of the NSDI, technology, policies, and standards that support "one-stop" access to the Federal government's GeoSpatial data assets. It will benefit all spatial data customers including Federal, state, local, and other governments, as well as private citizens, by providing a common, consistent source of GeoSpatial data. It will save all parties money by providing a market for data acquisition partnership opportunities and by making existing data more accessible. This initiative is one of the 23 E-Government initiatives selected by the President's Management Council (PMC). It will significantly enhance the implementation of E-government by enabling GeoSpatial data to be more accessible and usable.

E-Gov Web Portal Hazard: Initial steps for the Hazards E-Gov has been to develop a government-wide top-down strategy, including defining a vision, mission, two goals, and measurable objectives. These have lead to some initial tasks. NOAA is involved in one goal, to develop an integrated Web portal for hazard information which may include training, communications, and logistics as well as hazard information. Initial tasks are focused on identifying potential NOAA contributions. The first steps are to identify and coordinate with potential NOAA contributors, e.g., NESDIS, NWS, NOS. As part of the DOC team, EDA and NIST play a role as well. Keeping in line with the government-wide top down approach, NOAA will make increasingly more detailed contributions, building on previous submissions.

The first submission, April 11, 2002, was a preliminary list of some NOAA categories. Later contributions will lead to an expanded list of categories, and a list of appropriate existing Web sites. Discussions at future meetings will help direct the evolution. The E-Gov Hazard team is mostly in a discovery phase, looking at possible scope of effort, and possible approaches. An aspect of the NOAA strategy will be to try to keep the effort doable, especially noting a short delivery date for a prototype portal. Initial efforts should focus on existing Web sites, and a development effort that is primarily developing a Home Page that links to existing Web sites. The First Gov effort is one model to consider.

In the long term NOAA, as part of the DOC team, must work cooperatively with its sister agencies throughout the government. The evolution of this effort is not determined yet. Success will in part be dependent on close coordination amongst the DOC participants, and involvement of management if and when issues arise.

OAR -

E-Grants: OAR is playing a major role in one of the President's E-Gov initiatives, E-Grants. As one of DOC's largest granting organizations, facilitating the grant application process and management of grants is a high priority. Recently, OFA decided to go forward more aggressively with this integration, which will serve as the model for all granting units of DOC.

OAR staff has been involved in the NOAA "Grants OnLine" development effort since P.L. 106-107 was signed, on November 20,1999. The project was initially started as a grass roots effort to integrate two in-house applications that were being developed separately. OAR staff has worked hand-in-hand with the Grants Management Division and other NOAA Line Offices, helping with the initiatives to secure funding, acting as an advocate for the system to management, and documenting requirements, and will continue to do so.

e-Authentication: OAR has two staff members participating on the NOAA PKI (Public Key Infrastructure) Teams, and will continue to support this critical initiative.

OFA

Grants Online: NOAA annually processes over 1,200 grants and completes over 1,500 related administrative monitoring actions with a total value of over $750 million dollars. The current system, largely paper-based, is burdensome and inefficient for both NOAA and grant applicants. Existing grants-related applications are stovepiped, and designed to meet the individual requirements of specific NOAA components. There is an increasing lack of integration among the NOAA systems and some are technically dated. NOAA management has established grants process automation as one of its primary goals.

A team, led by OFA, has been organized to support this goal by validating the requirements; assessing how these requirements could be met (including a review of existing systems, both other government systems and commercial products); and recommending the best way to meet the requirements. The team is recommending a three-prong approach for achieving Grants Online in NOAA:

1. *Maintain close coordination with the Federal E-Grants initiative.* The government-wide E-Grants Initiative is being led by the Department of Health and Human Services (HHS). This effort is focused on the "front-end" – basically the customer (grant applicant)-friendly interface. NOAA will continue to participate on the working groups established by HHS to address standardization and process re-engineering within the grant process. NOAA will also continue to work with HHS on the Federal E-Grants Portal pilot project, to be hosted by the General Services Administration, and will ensure that NOAA's future system is compatible with this portal.

2. *Actively participate in the research grant application pilot headed by the Office of Naval Research (ONR) (at the direction of HHS).* ONR is interested in collaborating with NOAA in their development process by providing standards and requirements for NOAA electronic grants. The NOAA grants team will participate fully with the ONR project in creating a prototype electronic research grant application. By doing so, NOAA will leverage the efforts of other federal agencies for its needs.

3. *Initiate an internal effort to assess NOAA's "back-end" grant processing requirements and address these requirements in an integrated, electronic grant processing system.* The first step of this effort will involve assessing the current NOS, NMFS, and OFA existing systems and determine what can be upgraded and integrated into a single unified modern system.

NOS

NOS is represented on several OMB E-Government initiative teams: Recreation One Stop, e-Grants, Disaster Assistance and Crisis Response, and GeoSpatial Data One Stop. In addition, NOS offices work closely with NESDIS and the FGDC to provide data to the public and other Government agencies through data clearinghouses using standard metadata. NOAA Server, the Coastal Information Database (CID), and the Coral Reef Information System (CORIS) are examples of how NOS supplies data and metadata to a central location for dissemination to the public.

IT Planning and Investment Review

Description: NOAA spends over $450M annually on information technology. Many new investments proposed during the development of NOAA's annual budget request involve information technology. Investments in IT often involve the management of many different kinds of risk. Both Government-wide policies and prudent management practices require NOAA to implement processes to plan and review investments in IT.

Status: NOAA has implemented an IT Planning and Investment Review process in accordance with Department of Commerce policies and guidance. A NOAA Investment Technology Review Board (the NITRB) has been established. All IT budget initiatives and all major IT acquisitions are reviewed by the board. NOAA uses the OMB Circular A-11, Exhibit 300 format to document its major IT systems.

Future Direction/Actions: NOAA will continue to annually prepare strategic and operational IT plans. NOAA is supporting the Department's decision to implement the IT Investment Portfolio System (I-TIPS) as its Capital Planning and Investment Control System. NOAA is also working to comply with the OMB requirement to use the Exhibit 300 to document 60% of the investments in its IT Portfolio.

Milestones	FY Goal	Completion/ Revised Goal
Strategic IT Plan	Annual (June)	FY02 (August)
Operational IT Plan	Annual (Nov)	
Implement I-TIPS	FY 02	
60% of IT Portfolio Covered by Exhibit 300s	FY 03	

Contact Point: Robert Kidwell (301-713-3525, ext.196)

Privacy

Description: NOAA's systems primarily deal with environmental data for which there are no privacy concerns. NOAA uses the Web to disseminate enormous quantities of data. Collecting and storing information on the individuals who access NOAA's Web sites would be a privacy concern.

Status: NOAA has implemented the Department-wide policies on privacy. No personal information is collected or stored about usage of NOAA's Web sites.

Future Direction/Actions: NOAA plans to annually certify that its Web sites are in compliance with Department policy.

Milestones	FY Goal	Completion/ Revised Goal
Annual Certification of Web site compliance	2002-2007	

Contact Point: David McClure (301-713-3555, ext. 211)

Software Management

Description: Software management is the discipline of applying technical and administrative oversight to:

- Identify and document the functional and physical characteristics of a software configuration item.
- Control changes to configuration items and their related documentation.
- Record and report change processing and implementation status.
- Audit the process and its records.

Software management is closely bound to the concept of "Configuration Item" and "Request for Change". No configuration item is moved or modified without a request-for-change being created to document and control its changes and movement.

Software management can also involve the implementation of standards so that the organization uses common software to meet organizational requirements.

Status: In NOAA software management, including configuration and change management, are being done at the Line Office level. NESDIS has established performance measures that will lead to 100% of their systems having software management plans in place by FY 2004. OAR has implemented configuration management plans for its major systems. NMFS has implemented policy and procedures for managing the hardware and software for its wide-area-network. NMFS also has a change management process in place for nationally-managed systems. Each NOS office has prepared a software management strategy for the NOS CIO. OFA uses a four- step System Development Methodology as the basis for their software management efforts.

Future Direction/Actions: Due to the wide diversity in software requirements throughout NOAA, software management will continue to primarily be focused within NOAA's Line Offices. This issue will be addressed in each Line Office's annual IT Operational Plan.

At the NOAA level, the CIO Council continues to monitor NOAA's use of office automation software. A review of this issue focused on cost, document exchange, and collaboration issues is scheduled for December 2002. The emergence of open source software is also a factor to be considered.

Efforts are also underway to develop a NOAA policy governing the "look and feel" of NOAA Web sites. This policy will be designed to improve the dissemination of information through the Web.

Milestones	FY Goal	Completion/ Revised Goal
Each L.O. Address Software Management in Operational Plan	Annual (Nov)	
Revisit Decision on Office Automation Software	FY 03	
Implement Web Page Standards	FY 03	

Contact Point: Line Office CIOs.

Active Directory

Description: With the Windows 2000 generation of operating systems Microsoft introduced Active Directory service as an integral part of their networking operating system. Active

Directory is designed to allow organizations with distributed computing environments to centrally manage and share information on network resources and users. Active Directory can act as a central authority for network security, by letting the operating system readily verify a user's identity and control his or her access to network resources. While primarily a Windows-based service, Active Directory can also integrate systems not using Windows with Windows-based applications, and Windows-compatible devices.

NOAA program offices have been reluctant to implement Active Directory for a variety of reasons. Designing the directory is a complex task. The directory should be implemented at the highest agreeable level, and determinating what is the highest level has proved difficult. Migration to Active Directory is a tedious task which must be done carefully – offices do not want to have to migrate a second time if the directory structure changes.

However, it is apparent that Microsoft will continue to integrate Active Directory into their line of software, probably requiring Active Directory to be installed. Windows NT, the operating system which most NOAA Windows networks currently use, will no longer be supported by Microsoft at the end of 2003. With the end of life for Windows NT less than eighteen months away, implementing Active Directory becomes more urgent.

Status: A NOAA-wide Active Directory Working Group (ADWG), with membership from all NOAA Line Offices, was established to examine how best to implement Active Directory in NOAA. The group has studied various implementation scenarios but, without any real expertise in Active Directory, was unable to reach a conclusion on the best way to proceed. The group requested approval and funds from the NOAA CIO Council to hire a consultant to study NOAA's current Windows directory structure, networking infrastructure, and technology architecture (which includes other Operating Systems)to determine the best implementation of Active Directory in NOAA. The CIO Council concurred and the five NOAA Line Offices agreed to fund the consultant.

In July, 2002, the paperwork to hire the consultant using an existing contract vehicle was sent forward to the Procurement Office. A consultant will be chosen by the ADWG after review of several resumes. The consultant should be on board by mid-August, 2002. In the meantime, the ADWG is preparing network and computer infrastructure documents to provide the consultant with background information as soon as he or she starts.

Future Direction/Actions: Future actions are dependent on the results presented by the consultant. The consultants findings will be presented to the NOAA CIO Council. If the CIO Council approves the plan, the ADWG will continue.

The ADWG expects the consultant will recommend one of several Active Directory implementation options: NOAA-wide, Line Office level, geographically, or individual LAN office. Under any of these situations, the ADWG will evolve into the Active Directory Configuration Board to address directory design and implementation issues. The ADWG understands it is also possible that the consultant may recommend no formal Active Directory implementation at NOAA.

Milestones	FY Goal	Completion/ Revised Goal
Consultant studies NOAA for AD recommendation	FY 02	
Findings presented to CIO Council	FY 02	
Creation of ADCB	FY 02	
Active Directory schema design	FY 03	
Requirements Inventory	FY 03	
Development of NOAA AD implementation plan	FY 03	
Migration to AD	FY 04	

Contact Point: Lara Petze (301-713-2777, ext.142)

Administrative Systems

Description: Administrative Systems consist of the many diverse information technology applications that are necessary to perform a broad range of corporate enterprise business functions critical to properly execute the programmatic mission of NOAA. These functions include: management of human resources, management of appropriated funds, management of facilities and of capitalized and non-capitalized assets, acquisition of goods and services, award and management of grants, delivery of payroll services, environmental compliance and safety, assurance of physical security, and correspondence control.

Administrative Systems are strategic business assets that provide the corporate foundation to allow NOAA's programmatic managers to pursue NOAA's mission to describe and predict change in the environment, and to conserve and manage coastal and marine resources. These systems provide the business tools to manage the complex mix of people, money, buildings, contracts, grants, laws, and policies used to produce the predictions, studies, and data products of NOAA. Highly functional and efficient Administrative Systems contribute directly to the accomplishment of NOAA's science-based mission.

NOAA is committed to robust Administrative Systems and their underlying information technology and infrastructure and has identified a number of long-term goals in this area. These goals include:

- A commitment to invest in the modernization of administrative systems.
- Appropriate automation of administrative processes.
- Establish and maintain an Administrative Systems Architecture.
- Strive for Administrative Systems that are compatible, interoperable, secure, and complaint with federal regulations.

- As appropriate, encourage Administrative Systems that share data across business functions throughout NOAA and with key outside organizations such as other federal agencies and grantees.
- Ensure that corporate data and records are accessed electronically by employees, grantees, suppliers, programmatic stakeholders, and the public in an integrated, secure, and reliable environment.

Status:

Below is a list of NOAA's major administrative systems

CCS	NOAA Correspondence Control System
CFS	CAMS Core Finance System
COOL	Commerce Opportunities Online
CPCS	CAMS Commerce Purchase Card System
CSPS	CAMS Commerce Small Purchase System
CSTARS	Commerce Standard Acquisition Reporting System
FACTS	Financial Analysis Commitment Tracking System
FADS	Federal Assistance Disbursement System
FRS	Financial Reporting System
FIMA	Finance Information Management System
FOIA	Freedom of Information Act
FOPS	Financial Operating Plans
FUNDS	Fund Status System
I/FIMA	Interactive Financial Management System
LOCATOR	NOAA Locator
NGS	NOAA Grants System
NPS	NOAA Payment System 2000
OBI	Oracle Based Information Commitment Tracking System
PERSNNL	Personnel
RENTS	GSA Rent Allocation
RTPS	Reimbursable Task Plan System
T&A	Payroll
TM	CAMS Integrated Travel Manager

Finance - NOAA and DOC have engaged in a decade-long effort to modernize financial systems through the development of the Commerce Administrative Management System, which is scheduled to come online in October 2002. CAMS is designed to replace and consolidate numerous financial management systems and subsystems throughout NOAA.

Acquisitions - The DOC and NOAA Acquisition offices have worked closely with the DOC Chief Financial Officer to acquire and deploy CAMS-related and off-the-shelf acquisition systems that will work in an integrated manner with CAMS. These systems include CSTARS, CPCS, and CSPS.

Human Resources - The NOAA Office of Human Resources has worked closely over the last five years to acquire new modern HR systems, in particular the COOL system. Additional innovations, such as Web Time and Attendance, are expected to be deployed in the coming months.

Grants - NOAA annually processes over 1,200 grants and completes over 1,500 related administrative monitoring actions with a total value of over $750 million dollars. The current system, largely paper-based, is burdensome and inefficient for both NOAA and grant applicants. Existing grants related applications are stovepiped, and designed to meet the individual requirements of specific NOAA components. Many of the existing Line Office systems, including OFA's Grant Management System, are technically dated. NOAA management has established grants process automation as one of its primary goals.

Controlled Correspondence - The Department has acquired the WEBCIMS off-the-shelf product for correspondence control. NOAA management has approved the purchase of WEBCIMS; implementation planning is underway.

Future Direction/Actions:

NOAA will continue to complete an IT Architecture for Administrative Systems. Future Administrative Systems will be based upon this NOAA-wide architecture with standards and guidelines that will promote interconnectivity and interoperability across all administrative systems.

Milestones	FY Goal	Completion/ Revised Goal
Implement CAMS	FY 03	
Compete Administrative Systems IT Architecture	FY 03	
Complete Plans for Modernization of Grants Systems	FY 03	
Complete Plans for new Controlled Correspondence	FY 03	

Contact Point: Rob Swisher (301-713-3370)

High Performance Computing

Description: NOAA operates two large supercomputers and one smaller one. The larger computers are at NWS/National Centers for Environmental Prediction (NCEP), for weather forecasting and model development, and at OAR/Geophysical Fluid Dynamics Lab, for climate and weather model research and for extended climate simulations. The smaller computer, at the Forecast Systems Lab, primarily conducts weather modeling research. As these are expensive, but useful resources, it is critical that NOAA manage them carefully.

Status: Three years ago NOAA conducted an intensive year-long study to determine the best architecture for its supercomputers. The study was conducted with wide NOAA involvement and the assistance of a widely-recognized outside expert. The study concluded that NOAA's architecture reflected its current needs, and that the highest requirement for additional computation was as a backup to the NCEP operational computer and as augmentation to our climate computing capacity. These requirements are on the verge of being met.

Future Direction/Actions: With changing missions and technology, it is now time to update that study. Computers have become larger and more powerful and the NOAA mission has matured in the area of climate modeling. This necessarily leads to a re-evaluation of the proper mix of computation across the agency. In addition, technology advances in the related area of telecommunications have made remote siting of computers worth reconsideration.

Milestones	FY Goal	Completion/ Revised Goal
Revise the NOAA HPCC Study	FY 03	

Contact Point: William T. Turnbull (301-713-3573)

Remote Access

Description: One of the fastest growing trends in the Federal workplace today is the movement toward remote access to the network, which includes telecommuters who work from home and mobile users who work at multiple stationary work stations or may carry laptop computers and other various digital devices (i.e., cell phones, Palm or Windows PDAs, Blackberry, etc.) while away from their primary office or while on travel. Accompanying the growth of telecommuting is the rapidly rising popularity of "always-on" broadband connections and networks in the home. Remote access users and telecommuters present a variety of threats to information security. The use of broadband connections away from a secured office network environment results in an additional set of unique risks to the user and to NOAA.

Status: NOAA does not have an effective up-to-date Remote Access Policy. NOAA is in the process of establishing an IT policy that covers remote access users and of improving its infrastructure to protect NOAA IT networks and resources from the risks imposed by remote access users. The NOAA Architecture Working Group reported to the NOAA CIO Council in May, 2002 recommendations for NOAA-wide remote access policy to protect NOAA's IT infrastructure from threats associated with remote access. The group also presented the same set of recommendations to the DOC CIO Council in May, 2002.

Future Direction/Actions:

- NOAA CIO Council must complete its review of and approve the NOAA Remote Access Policy. The CIO Council must determine if there is to be one enterprise-wide implementation plan or if each Line Office is to develop its own specific implementation

plan. As written and presented, the NOAA policy only provides minimum requirements. This provides maximum flexibility to the Line Offices to establish a remote access plan that meets its specific mission requirements.

- Complete a Best Practices Guidance for remote access usage.

- Each Line Office must develop a detailed Line Office Policy, if necessary. The policy should include:
  - Specific acceptable use policy.
  - A user access agreement.
  - Broadband reimbursement policy, if appropriate.

- Determine and implement appropriate and specific security controls for remotely accessible applications.

- Prepare easy-to-understand user guides.

Milestones	FY Goal	Completion or Revised Goal
Approve and disseminate NOAA Remote Access Policy	FY 03	
Develop a Remote Access Best Practices Guidance	FY 03	
Draft specific acceptable use policy	FY 03	
Prepare a user access agreement	FY 03	
Develop a policy/procedure to obtain data from NOAA's data centers, laboratories and other offices using FTP.	FY 03	
Establish and implement appropriate educational campaign to explain the threats introduced by remote access capabilities	FY 03	
Initiate and evaluate Pilot Remote Access Program	FY 03	

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IT Acquisition Streamlining

Description: The Business Process Analysis Division (NOAA Office of the CIO) and the Acquisition Management Division (Acquisition and Grants Office) have established Blanket Purchase Agreements (BPAs) and contracts with General Services Administration (GSA) Federal Supply Schedule (FSS) contractors for IT Products and Services. These agreements enable NOAA Line and Staff Offices and other Department of Commerce Operating Units to purchase IT hardware systems, software licensing, and professional services using a streamlined acquisition process. NOAA Information Technology Electronic Store (NITES) Web site

(http://www.nites.noaa.gov) provides an electronic means for ordering these products and services.

Post-acquisition support includes contract administration, customer education, and customer feedback sessions. Contracts and BPAs are awarded through a competitive process and are "best value" awards based on technical solutions, discounts from the contractor's FSS, value-added services (both charge and no-charge), and past performance. The contracts and BPAs are reviewed periodically and not less than annually by the NOAA Office of the CIO and the Acquisition Management Division.

Customer education and feedback are important elements of the Program. NITES is able to provide NOAA and the Department a forum for exchanging information about technology innovations and IT training through conferences and seminars. In the Spring of 2001 NITES hosted an Inter-agency seminar sponsored by Adobe on "Accessibility and Section 508" and a training seminar for Macromedia software products at the Silver Spring, MD Metro Campus. In August 2001 NITES sponsored an "Adobe Day", and in December 2001 a "BPA Day". At both these events, employees were able to participate in free educational tutorials and presentations that not only showcased the latest products and services available from the IT industry but also provided training opportunities and product demonstrations from company experts.

Status: This highly successful Web-enabled NITES Program has saved the agency over five million dollars in direct savings during the past five years and additional savings in time and effort in the procurement process. Approximately 88% of the hardware systems and 93% of the software licenses purchased by NITES customers are Government purchase card transactions. NITES vendors also support electronic commerce Web sites for purchasing on-line.

PC Systems: NITES currently offers agreements for purchasing PCs and networking equipment, including printers and other peripherals, and related installation and maintenance services, at discounted pricing. Current suppliers include Dell, Gateway, and Westwood for Compaq and Hewlett-Packard systems and networking equipment.

Software Licensing: Software agreements currently available include Adobe products for electronic publishing and e-forms solutions; a BPA for GSA's Microsoft Select Program for applications, system, and server software pools; ESRI for geographic information systems (GIS) and mapping software; RSI's IDL product line for data visualization and analysis software; ISIResearchSoft for bibliographic management software used by NOAA researchers for publishing and NOAA librarians for cataloging research articles and other publications; Winzip's file compression utility; McAfee Active Virus Defense Suite software on desktop, server, and gateway computer systems throughout NOAA; and Verity's KeyViewPro viewer software.

IT Professional Services: BPAs for contractor services are available from small and large businesses specializing in technical studies, PC and LAN support, telecommunications and software development and maintenance.

Section 508 Compliance: To help meet the Federal Government's IT Accessibility Initiative and save customers time and effort in certifying their procurement actions, each vendor's response to the applicable subpart of the Section 508 Technical Standards Vendor's Checklist, Part 1194 for Electronic and Information Technology Accessibility Standards, is available on the NITES web site: http://www.nites.noaa.gov/info/section508.asp.

Future Direction/Actions: The Business Process Analysis Division and the Acquisition Management Division will continue to assess NOAA IT requirements and implement contracting methods that benefit NOAA and Department of Commerce Mission Programs and support agency Administrative Programs.

The NITES Program is expanding its partnership to include NOAA's Human Resources (HR) Office. A pilot classroom training offering is planned for June 2002 and if successful, will be incorporated as part of HR's Career Development Computer Training Program. Two assessment sessions were conducted that focused on features and capabilities of Adobe's Acrobat software. Based on feedback from more than 20 NOAA participants, trainers will be teaching Acrobat classes tailored to the needs of NOAA's employees, including technical solutions for PDF files and Section 508 accessibility.

When possible, follow-on software training will also be incorporated as part of the NITES software licensing contracts and BPAs. An FY 2002 pilot has provided a model for the future that can be used to train (on-site and remote-site) NITES customers. The EndNote, ProCite, and Reference Manager ISI contract included built-in training for NOAA's researchers and librarians at five central sites at no additional fee. Since the summer of 2001, training has been provided to over 200 NOAA employees at Silver Spring MD, Seattle WA, Boulder CO, Ann Arbor MI, and Miami FL. Net conferences included the National Centers for Coastal Ocean Science (Beaufort NC, Charleston SC, Oxford MD); the NW Fisheries Science Centers (Newport OR and Port Orchard WA); and the Atlantic Oceanographic and Meteorological Laboratory and SW Fisheries Center (Miami FL).

Milestones	FY Goal	Completion/ Revised Goal
Section 508 Accessibility Compliance	On-going	
Enterprise-wide contract for SAS products (NOAA, BEA, ITA)	FY 02	
Expanded NOAA licensing to Web of Science Citation Databases	FY 02	
Pilot on-site training for Acrobat and other Adobe software	FY 02	
OFA/NCIO Asset Management Project (HW/SW PC Inventory)	FY 02	

Milestones	FY Goal	Completion/ Revised Goal
Web-based customer ad hoc and standard query and reporting	FY03	
Tracking database to measure contract/BPA performance statistics (i.e., time to product delivery, sales volume, electronic commerce transactions, etc.)	FY 03	

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NOAA INFORMATION TECHNOLOGY PLANS ORGANIZED BY NOAA'S STRATEGIC PLAN GOALS

The following section is arranged by the goals established by NOAA's Strategic Plan. Under each goal individual information technology systems are addressed. These systems were selected for one or more of the following reasons: (1) they are major information technology systems essential for meeting a strategic goal, (2) they are expected to be the focus of a budget initiative, (3) they are major systems or systems development projects at or near a key decision point in their life cycle, and/or (4) they are major systems with outside interest. Some systems support more than one goal. In these cases they will be addressed in the primary goal being supported and cross-referenced under the other goal(s).

For each system this plan provides a general description of the system, its role in achieving the NOAA strategic goal, and its general plans. Performance measures for the system's support of the program and milestones for key future actions are included. Budget estimates are provided at the end of each goal's section. These estimates are for only the IT portion of the system, and reflect the money necessary for the related hardware, software, maintenance, services, support services, and personnel costs (as defined by OMB Circular A-11). Both base funding and proposed budget initiative funding are included. The figures for FY 2003 are from the President's budget, while the figures for later years are ones to be included in NOAA's FY 2004 budget request to the Department of Commerce.

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STRATEGIC GOAL: ADVANCE SHORT-TERM WARNING AND FORECAST SERVICES

The Programmatic Goal and Objectives: NOAA's vision for 2005 is to provide significantly improved short-term warning and forecast products and services that will enhance public safety and the economic productivity of the Nation. NOAA will enhance its ability to observe, understand, and model the environment, and effectively disseminate products and services to users. The four major objectives of this goal are: to maintain National Weather Service (NWS) Modernization Operations, to maintain satellite continuity, to enhance observations and predictions, and to improve service communication and utilization. Forecasts of environmental conditions depend upon the acquisition of massive amounts of data and the ability to quickly run prediction models using these data. Advances in these areas are dependent upon improvements in information technology and its use. The modernization and restructuring of NWS is dependent upon the successful implementation of information technology systems. The primary Line/Program Offices involved in this goal are NWS; the National Environmental Satellite, Data, and Information Service (NESDIS); the Office of Oceanic and Atmospheric Research (OAR); the National Ocean Service (NOS); the Coastal Ocean Program Office; and the Systems Acquisition Office (SAO).

Performance Measures: The IT systems described in this chapter collectively contribute to the accomplishment of the performance measures set for this strategic goal. While additional measures will be shown for specific systems, it is impossible to separate the contributions of individual systems towards achieving the overall goals. The overall measures are provided here to show how modernization investments will benefit the public.

Advance Short-Term Warning and Forecast Services Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Tornado warning lead time (in minutes)	10/13	11/13	11/14	12/14	13	13
Tornado warning accuracy (%)	68/70	69/70	70	71/70	72	73
Tornado warning false alarm rate (%)	72/86	71/86	70/86	70/86	69	68
Flash flood warnings lead time (in minutes)	46/57	45/57	46/57	47/57	47	48
Flash flood warning accuracy (%)	86/86	86/87	87/88	87/88	88	88

Advance Short-Term Warning and Forecast Services Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Winter Storm Warnings Lead Time (hours)	13/13	13	14/13	14/13	15	15
Winter Storm Warnings Accuracy (percent)	90/86	86	88/86	88/86	90	90
Aviation forecasts accuracy (%)	18/21	18/21	19/21	20/21	22	25
Aviation forecasts false alarm rate (%)	51/46	52/46	52/46	52/46	51	49
Marine forecasts accuracy (%)	52/53	53	54/53	55/53	56	57
Precipitation forecasts accuracy of 3-day forecasts (%)	19/22	17/22	19/22	21/22	23	25

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

Advanced Weather Interactive Processing System (AWIPS): AWIPS is a technologically-advanced information processing, display, and telecommunications system that is the cornerstone of the NWS modernization and restructuring. AWIPS is an interactive computer system that integrates all meteorological and hydrological data, and all satellite and radar data, and enables the forecaster to prepare and issue more accurate and timely forecasts and warnings. Through the implementation of AWIPS, the NWS will meet its mission "to provide weather and flood warnings, public forecasts, and advisories for all of the United States, its territories, adjacent water and ocean areas, primarily for the protection of life and property" more efficiently and effectively. It is a key element of the "maintain NWS Modernization Operations" objective under the "Advance Short-Term Warning and Forecast Services" goal of NOAA's Strategic Plan.

The acquisition and installation of a backup Network Control Facility will take place in FY 2002 and FY 2003. The NWS is proposing to move AWIPS to a LINUX-based system.

AWIPS consists of an integrated suite of automated data-processing equipment located in field offices and National Centers (the National Centers for Environmental Prediction, the Office of Systems Operations, the Hydrologic Information Center, the National Operational Hydrologic Remote Sensing Center, and the NWS Training Center) to support complex analysis, interactive processing, display of hydro-meteorological data, and the rapid dissemination of warnings and forecasts in a highly reliable manner. A Wide-Area-Network connects sites for multi-point-to-

point and point-to-point communications. NOAAPORT provides the communications capability, via a satellite broadcast network, to afford internal and external users open access to much of NOAA's centrally collected and produced real-time environmental data. Efforts are on-going and proposed to ensure the AWIPS hardware platforms and supporting communications infrastructure can accommodate planned future development.

The AWIPS site architecture is an Open System implementation. The use of open systems has been a key aspect of the AWIPS design and will continue to influence design and implementation decisions. This approach has resulted in a standards-based, client/server system that provides isolation of applications, data, and system-level functions from hardware implementation and software services to eliminate dependency on vendor-unique products. The system architecture emphasizes the use of commercial-off-the-shelf (COTS) hardware and software, and functional independence of components to deliver a system that is flexible, expandable, and portable. This approach maximizes the intended long-term life of the system.

AWIPS benefits the operations of the NWS by:

- Providing computational and display functions for operational NWS sites;
- Providing open access, via NOAAPORT, to extensive NOAA datasets that are centrally collected and/or produced;
- Acquiring and processing data from an array of sensor systems (e.g., the WSR-88D radars, ASOS, and GOES) and local sources;
- Providing an interactive communications system to interconnect NWS operational sites and to broadcast data to NWS sites; and
- Disseminating warning and forecasts in a rapid, highly reliable manner.

In particular, AWIPS provides several service-related capabilities and integration of data at a level never before achieved by previous systems. AWIPS provides:

- Collection, processing, and display of data via one system;
- Integration of all critical data sources, e.g., radar, satellite, observations, and models;
- Single, integrated forecast operations with interactive analysis of data and forecast preparation;
- The ability to “drive” the NOAA Weather Wire Service and local dissemination circuits and automated NOAA Weather Radio;
- The ability for one Weather Forecast Office (WFO) to back up a second WFO that experiences system failure;

- The capability to acquire directly local data sets;
- Access to WSR-88D data from non-associated radars in order to not miss events; and
- The capability to ensure consistency of warnings and forecasts over multi-WFO areas.

System Status and Plans - AWIPS completed deployment in June of 1999. Commissioning of all sites was completed in August, 2000. AWIPS Build 5 will be complete in September, 2002. Build 5 extended the AWIPS functionality to: (1) implement warning decision support tools proven to improve convective storm warning verification and reduce false alarm rates, (2) replace and enable decommissioning of the NEXRAD principle user processor (PUP), and (3) provide productivity enhancing functionality.

As part of the Government's Critical Infrastructure Protection (CIP) initiative, backup protection is being provided for both the AWIPS Satellite Broadcast Network Master Ground Station (MGS) and the AWIPS Network Control Facility (NCF). The backup Master Ground Station was completed and became operational in September 2001. Acquisition and installation of the backup Network Control Facility will take place in FY 2002 and FY 2003. The backup facility is located in Fairmont, West Virginia.

The AWIPS program is capitalizing on recent advances made in relevant technologies. The goal of this effort was to achieve greater hardware independence for the AWIPS system and reduce software dependence on any particular hardware platform. Through this effort, it was found that LINUX-based AWIPS software could be run on a number of computer platforms. This has made it possible to achieve AWIPS functionality and better performance on desktop PCs and even laptop computers. It was found that by using a LINUX-based system more processing and storage capability could be achieved at a lower cost and with more reliability. The system would provide a cost effective method to achieve the technology infusion goals necessary to allow AWIPS to work with higher volumes of model and radar data and new automated decision assistance tools.

Presently, NWS has undertaken Phase I of the LINUX Evolution Project. This project includes adding two LINUX-based PC Workstations to each NWS Warning Forecast Office, replacing the WFO Communications Processor with a LINUX-based CP and adding a LINUX-based Data Server Pre-processor allowing AWIPS to keep pace with ever increasing processing demands. A FY 2004 initiative is proposed to complete the LINUX evolution of the AWIPS system (Phase II). This initiative will allow AWIPS to meet the processing demands of the nation into the future.

Performance Measures - See the performance measures for the strategic goal.

The Weather and Climate Supercomputing Central Computer System: The Weather and Climate Supercomputing Central Computer System (CCS) is required to provide weather and climate modeling capabilities supporting the implementation of an operational integrated suite of climate and weather forecasts - a core National Centers for Environmental Prediction (NCEP) function. NCEP serves as America's primary source for information on the future behavior of our physical environment, including changes in the weather, oceanic conditions, climate variations, and fluctuations in the near-space environment. The NCEP uses sound scientific precepts to convert environmental observations into projections of future conditions that affect our society. In doing so, the NCEP leads the Nation in combining scientific and technological advances to provide the best possible forecasts of our physical environment to meet the daily needs of the American people.

A replacement supercomputer should be in place during FY 2003. Upgrades to the NCEP communications system are expected in FY 2003-2004.

NCEP is comprised of nine centers, and while each center has a specific responsibility for a portion of the NCEP products and services suite, they all work together. Seven of the centers provide direct products to users, while two of the centers provide essential support through the development and operational use of complex computer models of the atmosphere. The task of developing, running and disseminating these models to make timely forecast products requires enormous computing power and telecommunications. The IT resources of NCEP include supercomputers, telecommunications networks and powerful scientific workstations. NOAA periodically upgrades the NCEP high-end computing capabilities to improve its capacity to assimilate increasingly higher resolution data from satellites, radar, and other sources, to run more detailed, higher-resolution models and to implement an operational integrated suite of climate and weather forecasts. All of this effort is directed toward improving the accuracy of the Nation's environmental predictions.

The activities associated with the use of high-performance computing at NCEP support NOAA's strategic goals to "Advance Short-Term Warning and Forecast Services" and to "Implement Seasonal to Interannual Climate Forecasts". One of the implementation objectives under these goals is to strengthen prediction systems. In order for the public to capitalize on the investment in the modernization of the NWS, NCEP needs IT resources that can handle the increasing quantity of environmental data and integrate the improvements in meteorological and climate research in a way that results in better forecasting. Increased prediction accuracy for hurricanes, severe thunderstorms, floods, winter storms, seasonal-to-interannual climate changes, etc., has a significant economic impact on the Nation.

The NCEP architecture is open, heterogeneous, and multi-tiered. Within it, systems employ a common UNIX/Linux operating system, communicate via TCP/IP Ethernet, and exchange information using standard data formats. The network system at NCEP's Camp Springs location permits scientists to connect to the NWS high-performance computing resource directly from their desktop scientific workstations. This same network connects PC-based office automation

systems, output devices, and all UNIX/Linux systems. Internet access is universally available and security services are provided by dedicated staff members.

System Status and Plans - During FY 2002 NCEP's supercomputer activities include implementation of enhanced forecast models, augmentation of the current Class VIII, Phase II system to extend its useful life by one year, and an acquisition project for the next supercomputer system (the Central Computer System). A 12 km resolution ETA model was implemented in November 2001 and experimental nested ETA model runs at 10 km resolution were added at that time. An improved GLOBAL model (T254) is scheduled for implementation in June 2002. Two substantial augmentations to the IBM SP were required to handle these model upgrades. The tape storage subsystem was upgraded (starting in FY 2001) and a disk storage subsystem upgrade is in progress as of this writing (May 2002). No other system upgrades are anticipated and the Class VIII contract ends in September 2003.

The acquisition project for the replacement supercomputer (Central Computer System (CCS)) was formally initiated in 2000, conducted an industry dialog during 2001 resulting in a Request for Proposal in September 2001. Final revised proposals were received in April 2002 and award is anticipated in late May or early June 2002. NCEP worked closely with NOAA's Office of Finance and Administration and the Department's Office of the General Counsel to develop a contract with options that extend the total period of performance to nine years. The first small elements of the Central Computer System are expected in August 2002 with Acceptance during the first quarter of FY 2003. The Milestones and Performance Measures below, starting in FY 2003, reflect implementation of the CCS. Like the Class VIII contract, the CCS contract is Performance Based. A guaranteed minimum level of computational performance and system dependability are contractual elements.

The CCS acquisition includes an option for a Backup System; funding is sought through the Homeland Security initiative. The Backup System is sized to provide full operational product generation capability should the primary system become unavailable. When not performing its backup mission the Backup System will be used as a meteorological and climatological application development platform. Its most important research goals are to support the Joint Center for Satellite Data Assimilation application development and the new collaborative weather forecast model system (Weather Research Forecast (WRF)) development. Should the Government exercise the Backup System Option, implementation will follow the transfer of operations onto the CCS (3Q FY 2003).

The latest high performance computing initiative includes several critical subsystems, communications, interactive systems and maintenance/support. NCEP anticipates that these subsystems will be acquired through both standard procurement techniques and by utilizing new contracting vehicles that allow for some flexibility in providing a service to NCEP through either hardware, software or services or a combination.

An upgrade to NCEP's current communications system will be required to support the enhanced suite of products expected from the next generation high performance computing system and to support collaborative scientific research projects. The CCS will produce an entirely new suite of operational forecast products that must be transmitted to forecasters, in particular to those in the

NCEP National Centers, in order to realize the full benefits of climate prediction. Climate research and development projects will be conducted with the assistance of HPC centers operated by other agencies such as the Department of Energy, various Universities, and other NOAA offices. These projects require massive amounts of data for completion and NCEP scientists need high speed communications in order to efficiently conduct climate model research and development at distant HPC sites. NCEP plans to upgrade its communications system via a combination of existing Government contracts and existing commercial services during FY 2003 and FY 2004. The upgrades will be coordinated with actual increases in requirements; i.e., upgrades will not be purchased in advance of demand.

A collaborative effort (with NESDIS, NASA, and Census) is underway to develop a metropolitan- area network based on dark (i.e. private) fiber optical links carrying gigabit ethernet. Such a network will carry data between the Silver Spring headquarters campus, the University of Maryland (for Internet2 connectivity), Goddard Space Flight Center, the Suitland Federal office complex, the World Weather Building, and the Bowie Computer Center. The network is to be funded by a combination of NOAA High Performance Computing and Communications grant monies and contributions from the other agencies.

The cost estimates associated with communications were derived from preliminary discussions with FTS 2001 vendors. The TCP/IP network, established about 20 years ago at NCEP, will make future network interface straightforward since major communications vendors have stated their intention to move to completely IP-based networks in the near future. Networking hubs and other equipment will be required, especially during FY 2002, when the climate forecasting system is fully functional and product dissemination becomes critical. Recurring costs reflect cost estimates for ATM service provided by FTS 2001 vendors. This scalable service should prove to be the most cost effective way for NCEP to communicate with other HPC centers and its operational centers at the Tropical Prediction Center, Storm Prediction Center and Aviation Weather Center.

Interactive systems include the entire range of UNIX/Linux systems, desktop workstations, workgroup servers and larger application/communication servers. NCEP embarked on a UNIX system acquisition program about 15 years ago in an effort to provide its scientists with direct access to its HPC resource from their desktops. That program accomplished its goal and HPC access has been widely available. NCEP requires life-cycle system replacement to upgrade those that have become obsolete and a limited number that run the same UNIX version as the supercomputer system. Wherever possible, low cost Linux systems are used to replace expensive UNIX workstations. In addition to HPC connectivity, NCEP's UNIX systems perform other critical functions, such as producing graphics products for operational forecasting from HPC model output, reformatting data and products for dissemination within the NWS and for external users, handling data flow and reformatting data for communication networking, and scheduling the job flow on the NCEP HPC system, to name just a few. The cost for interactive systems is expected to increase with the augmentation of the Central Computer System to support the additional climate prediction products. The majority of interactive systems funds will be expended on application servers to host codes that can not use HPC resources efficiently but are too large for desktop systems. Each operational application server system (computer and associated RAID disk array) costs about $250,000 and requires a maintenance contract and

support. NCEP will require one or two of these servers each year. The remainder of the funds will support desktop system replacement, workgroup server acquisition, smaller disk and tape storage systems, output devices and maintenance contracts.

Support services have become essential in supporting NCEP's business plan. Contracts to augment the Government's capabilities in the areas of UNIX system administration, network administration, software development and software implementation are critical elements. In the future, NCEP expects these support contracts to expand in scope as the agency continues to become more efficient. NCEP is actively assessing its functions, seeking opportunities to establish outsourcing contracts, if practical.

Weather and Climate Supercomputing Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Hurricane Track Forecast: TPC (48 hours) error (nautical miles)	125/--	142	138	135	133	130
Precipitation Forecast - Accuracy of 3-Day Forecasts (%)	19/22	17	19	21	23	25
U.S. Seasonal Temperature Skill Score	20/20	20	21	21	22	22
Marine Forecasts (Winds & Waves) Accuracy (%)	52/51	53	54	55	56	57

* When two years are presented and divided by a "/", the first year represents the FY 01 accomplishment or the revised goal for future years. Note: Hurricane Track Forecast: TPC (48 hours) error (nautical miles) is new for 2001, therefore no previous value is available.

Weather and Climate Supercomputing Milestones	FY Goal	Completion/ Revised Goal
CCS Contract Awarded	FY 02	FY 02
Delivery of Services/Site Preparation	FY 02	FY 02
CCS Available (accept system)	FY 03	
Initiate CCS operational and transition activities	FY 03	
Implement T-254/L60 Global Model	FY 04	FY 02
Implement 10 km Eta Model	FY 04	
Implement 12 km Hurricane Coupled Ocean Model	FY 04	
Implement 5 km Threats model	FY 04	

Weather and Climate Supercomputing Milestones	FY Goal	Completion/ Revised Goal
Implement T62 Coupled Global Climate Model	FY 04	
Implement 40 km Global Model	FY 06	

NWS Telecommunications Gateway: The timely, reliable, and accurate dissemination of weather observations and guidance products is the critical mission of the NWS Telecommunication Gateway (NWSTG) operations facility. Delayed or garbled messages can result in the loss of life and property. The mission of the Gateway supports the NOAA strategic goal to "Advance Short-Term Warning and Forecast Services" and that goal's objective "to effectively disseminate products and services to users". Delayed or garbled information also negatively impacts the Department of Commerce mission of "...safeguarding the nations's economic infrastructure".

The NWS Telecommunications Gateway disseminates weather observations and guidance. A FY 2004 Initiative proposes to implement in the Silver Spring site the technology planned for the remote Backup system.

The Gateway provides message-switching services to a national and international community of customers. Flood and storm watches and warnings, weather forecasts, observations, and short-range climate forecasts are distributed to NWS field locations, U.S. Government agencies (FAA, DOD, FEMA, DOA), foreign governments, the university and research community, and private commercial users. The Gateway services a national and international customer base in a ~~near-~~ real-time operational environment.

The operational system continues to evolve to a network-centric architecture which will accommodate the legacy channel-connected structure. The higher capacity switch-engine, combined with distributed message and file processing, server delivery systems were implemented to permit the Gateway to collect the ever-increasing volume of observations from new observing systems and to disseminate the more frequent, larger-volume, finer-scale centralized forecasts from the National Centers for Environmental Prediction (NCEP).

In the past few years, data set sizes have experienced explosive growth. This growth is due, in part, to observations from new, automated, observing systems, and the new, finer-scale centralized forecast products from the meteorological centers such as the NCEP and the European Center for Medium-range Weather Forecasting (ECMWF). This increased volume of observations and the improved forecast products are required for achieving the NWS goal of improving national weather and climate forecasts as well as new aviation products for rapid delivery to FAA flight services.

NWSTG's legacy systems were designed to handle data sets in the multi-Kilobyte-size. The NWSTG is now required to accommodate multi-Megabyte-size data sets routinely, a thousandfold increase. File Transport Protocol (FTP) is the method of choice for the efficient

transfer of these large data sets and extensive Web-sites for selective data types delivered to a growing community of emergency managers and the public, but requires the TCP/IP protocol which runs on networks. The NWSTG has been required to adopt an architecture that accommodates WAN, LAN, E-Mail and router solutions, Internet, and Intranet connectivity to keep the NWSTG evolution in step with the systems of customers who are adopting these architectures as the standard medium of data exchange. Without this investment, the NWSTG will not be able to support its customers and take advantage of efficiencies in current and emerging communication technologies.

The installation in FY 2000 - FY 2002 of new higher-capacity servers now permits the NWSTG to collect and distribute radar and model products in ever-increasing volumes. The Telecommunication Operations Center (TOC) continues to move the NWSTG design toward distributed processors for collecting and distributing data with the implementation of a rapid radar products multicast for continuous delivery to government and commercial customers. This modular approach will allow the NWSTG to support current operations while embracing emerging information technologies. A major shift toward this modular approach occurred as a result of the FY 1995 - 1997 funding initiative with the development and deployment of major FTP and HTTP server clusters and the utilization of Internet2 for delivery of massive amounts of model products to the university community.

An allied trend is the adoption of the Internet as the communication system of choice by many NWSTG customers to obtain current information. The NWSTG first began providing information on the World-Wide-Web in 1994. By the Spring of 2002, the average daily users had increased to more that 625,000 and the data volume had risen to nearly 4,300,000 HTML pages of information retrieved from NWSTG servers each day; more than 40 Gigabytes of current information are stored on the server each day; and more than 151 Gigabytes of information are provided each day to Intranet customers using IP-based protocols (including DOD, FAA, and other Federal, State, and local government agencies). Extrapolating these exponential growth trends is hazardous at best, but NCEP anticipates model output alone will grow from 60 GB to 410 GB per day in FY 2004. Without a continuing investment in new telecommunications technology, the nation will not realize the maximum return on their investment in the NWS modernization.

The NWSTG has assumed many responsibilities previously done by military and other civilian Government agencies as they outsourced functions better done by other agencies. During the United Nations and NATO 2002 anti-terrorist activities in Afghanistan, the NWSTG was a primary source of meteorological data to the U.S., United Nations, and NATO operations. The TOC manages the Emergency Managers Weather Information Network (EMWIN). EMWIN is a satellite-based dissemination system using the GOES satellite platforms. Its purpose is to provide timely dissemination of warnings, watches, graphics, and other hydrometeorological data to any emergency managers within the satellite foot print. More than 3/4 of the Earth can receive the satellite transmission utilizing the current platforms: GOES-8, GOES-10 and PeaceSat (GOES-7 in the Pacific Rim). The EMWIN satellite broadcast provides users with a very low cost and effective data transmission systems. The NWS is also responsible as the U.S. agent for the operations of the World Area Forecast System (WAFS). WAFS is a satellite broadcast of observations, forecasts, model data, and facsimile charts to support aviation

operations reaching two thirds of the planet. The NWSTG manages the operation of the satellite broadcast for the FAA, the U.S. representative charged with aviation support. Because of this assumption of responsibility by the NWSTG, military and other Government agencies are no longer capable of assuming responsibility for providing back-up telecommunication and processing for the functions of the NWSTG. The NWS has become the principal Government provider of domestic and international meteorological information to other Government users.

System Status and Plans - The FY 2002 budget initiative to implement the NWSTG Backup in support of Critical Infrastructure Protection at the FEMA facility in Mt. Weather, Virginia is well underway. The hardware and software have been acquired and the build-out facility are located in the NWSTG. The acquisition of professional service to assist the NWS staff to design and build the Backup system is expected to be completed in May 2002. The contract for the new building is now expected to be completed in November with occupancy in November, 2003.

The FY 2004 Initiative for the NWSTG Legacy System Replacement is to also implement the technology planned for the remote Backup system in the Silver Spring primary site. This is to reduce resources and risk in supporting two locations.

NWSTG Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Operational Availability of selected high profile, circuits	99/99%	99%	99%	99%	99%	99%
Throughput time of high priority products such as weather watches and warnings (metric = seconds (less than))	120/ 120	120	120	10/120	10/120	10/120
Full Restoration of service using backup; metric = hours		12	12	12	12	12
Using Backup Percent availability		99%	99%	99%	99%	99%

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

NWSTG Milestones	FY Goal	Completion/ Revised Goal
Exercise option on Omnibus Maintenance Contract	FY 02	FY 02
Exercise option on IBM software Lease Contract	FY 02	FY 02
Procure and install NWSTG fire alarm system and retrofit	FY 02	Unfunded
Convert NWSTG Circuits to Fiber and Incorporate SONET-ring Technology	FY 02	FY 02

NWSTG Milestones	FY Goal	Completion/ Revised Goal
Award construction contract for facility to house NWSTG backup system - CIP	FY 02	FY 03
Complete high level design for NWSTG backup system	FY 02	
Exercise option on Omnibus Maintenance Contract	FY 03	
Exercise option on IBM software Lease Contract	FY 03	
Complete A-76 Cost Comparison for NWSTG Operations	FY 03	
Implement Contractor Organization or Government Most Efficient Organization for NWSTG Operations	FY 03	
Develop test procedures and define success criteria for each functional module and total system - NWSTG backup system	FY 03	
Exercise option on Omnibus Maintenance Contract	FY 04	
Exercise option on IBM software Lease Contract	FY 04	

Next Generation Weather Radar (NEXRAD) System: The NEXRAD system is one of NOAA's prime observation systems for acquiring information about meteorological conditions. Based on Doppler radar technology, a typical NEXRAD system consists of three major subsystems: the Radar Data Acquisition (RDA) subsystem, the Radar Product Generation (RPG) subsystem, and the Principle User Processor (PUP) subsystem. The RDA subsystem transmits the radar signals into the atmosphere. The RDA then receives the returned radar signal from precipitation and other targets and processes this "raw" radio frequency data into representative digital information known as "base data". This base data is then transmitted to the RPG subsystem over either hardwire, fiber optics, or microwave, depending on the radar's location. The RPG takes the base data, and using its computational power and resident algorithms, manipulates and processes the data into various weather "products" (wind velocity, precipitation, etc.). The product data is then passed, upon forecaster request, to the PUP, where it is converted into a visual representation of the digital data and presented to the forecaster.

NEXRAD is NOAA's Doppler weather radar system. Upgrades to processing subsystems are needed to increase the benefits being obtained from the system and to reduce its costs.

One of the objectives of the NOAA strategic goal for the "Advance Short-Term Warning and Forecast Services" is the enhancement of the observations needed to make warnings and predictions. NEXRAD is one of the key systems in NOAA's modernization and restructuring. By using Doppler radar technology, forecasters can observe the presence of precursor conditions

of severe weather such as tornadoes and violent thunderstorms. NEXRAD allows for the detection of wind circulation patterns (e.g., mesocyclones) as precursors to tornadic activity and provides data on the direction and speed of tornado cells once they form. NEXRAD also provides quantitative estimates of area precipitation, which are important in hydrologic forecasting of floods and in water resource management. The severe weather and storm wind field detection capabilities offered by NEXRAD have contributed to a significant increase in the accuracy and timeliness of NWS warnings. Nationwide implementation has increased tornado warning lead times from the pre-NEXRAD average of 5-6 minutes to 15-20 minutes for strong tornados (strength F3 or higher) while reducing false warning rates. The advantages of NEXRAD over conventional radars can be broken down into five basic areas: improved sensitivity, improved resolutions, wind velocity estimation, automated volume scanning, and capability for scientific processing of data.

The future benefits of this system are currently limited by the original proprietary hardware and software and the complicated nature of the software architecture, which make it very costly to maintain and evolve the system. Furthermore, the limited expansion capacity of the system's design prevents optimal use of weather radar data within the modernized Weather Forecast Offices (WFOs) and National Centers. Advances in the analysis of hydrometeorological weather radar data continue to be made, but not all can be implemented with the existing system. A planned product improvement program has been established to address these concerns with the IT systems and the need for increased functionality. The NEXRAD Product Improvement (NPI) Program was established to plan and implement continued improvement of the NEXRAD system to meet NOAA's strategic goal to "Advance Short-Term Warning and Forecast Services" for the general public, meet FAA requirements for additional and higher quality products, and meet DOD requirements for a radar products platform interoperable between NEXRAD and other DOD weather systems.

The primary goal of the NPI Program is to modify, augment and improve upon the existing capabilities of the NEXRAD system so it can support, in a cost-effective and timely manner, known operational requirements, as well as those requirements that can reasonably be anticipated. The NWS, working in partnership with OAR and other NEXRAD agencies, is developing two major upgrades to the NEXRAD radar system. Initially major efforts are being expended to upgrade the RPG and RDA data and signal processing areas to modern, open systems architecture. The upgraded components are termed Open System RPG (ORPG) and Open System RDA (ORDA). One of the first things ORPG will allow us to do is to provide full resolution WSR-88D data to forecasters (via AWIPS) for use in better detection of small tornadoes. The ORPG processing power will also allow us to implement additional scientific algorithms. With the ORDA, we will be able to extend the range of Doppler processing to 460 km, provide 1/4 km range resolution reflectivity data, and implement new volume coverage patterns for more efficient sampling of particular storm events.

The second upgrade is to the Doppler technology itself. This will improve the way the Doppler signal is transmitted and processed, resulting in Dual Polarized Doppler radar. Significant improvements should be achieved in estimating the amount of rainfall, identifying precipitation types (hail, snow, rain), and in removing non-precipitation information such as ground clutter.

System Status and Plans - The ORPG upgrade deployment is in its final stage, and will be completed in August 2002. Scientific enhancements are already being implemented with the new capability, with additional, specific enhancements planned for regular ORPG software releases through FY 2006. The ORDA upgrade is in the production development stage, and its deployment is scheduled to be completed in FY 2006. ORDA capability enhancements are being developed in parallel with the initial capability development. These enhancements will begin to be implemented on the new ORDA soon after its deployment.

NEXRAD Performance Measures	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Probability of Detection	.67/.68	.69	.70	.71/.70	.73/.72	.73
Tornado Warnings Lead Time (metric = minutes)	10/11	11	11	12/11	13/15	13
Tornado Warnings False Alarm Rate (metric = percentage)	72%/ 73%	71%	70%	70%	69%/ 55%	69%

NEXRAD Milestones	FY Goal	Completion/ Revised Goal
ORPG Integrated Test and Field Evaluation	FY 01	FY 01
ORPG Full Scale Production and Deployment	FY 02	FY 02
Open RDA Phase One - Start	FY 01	FY 01
Open RDA Phase One - Complete	FY 02	FY 02
ORDA Phase Two - Start	FY 02	FY 02
ORDA Phase Two - Complete	FY 03	
Evansville Radar Acquisition Installation	FY 03	
Evansville Radar Network Integration	FY 03	
ORDA Phase Three Start/Complete	FY 03	
ORDA Phase Three - Complete	FY 04	
ORDA Phase Four - Start	FY 04	
ORDA Phase Four - Complete	FY05	
Dual Polarization Development	FY 06	
Dual Polarization Testing	FY 07	

Geostationary Operational Environmental Satellites (GOES) Ground System:

The GOES program supports the NOAA strategic goal to "Advance Short-Term Warning and Forecast Services" through meteorological monitoring of the Earth. Real-time data from GOES satellites, combined with data from the POES satellites, as well as with data from doppler radars and Automated Surface Observing Systems (ASOS), have greatly aided forecasters in the prediction of hurricanes, tornadoes, thunderstorms, winter storms, flash floods, and other severe weather. Early warning systems like GOES contribute to saving lives, preserving property, and protecting commercial interests. To ensure proper geospatial coverage, two GOES satellites must be in operational status at all times - one each at an eastern and western continental United States viewing longitude. Replacement satellites are launched based upon launch facility availability as well as economic factors, and placed in standby or storage orbits until needed. The last of the present GOES I-M series of spacecraft was launched in July 2001, now designated GOES-12. In FY 2004, the first of the next GOES "N-series" (NO/P/(Q)), is scheduled for launch. The table below shows the number of satellites maintained and launches followed by the number/letter of the satellites included in the count. The number of satellites in the out years may change if some of the degraded satellites continue to function..

The GOES ground system monitors and controls NOAA's geostationary environmental satellites. Upgrades are underway for future satellites.

GOES Satellite Counts	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
# of satellites in operational status	2/2 (8,10)	2 (8,10)	2 (10,12)	2 (10,12)	2 (10,12)	2 (11,12)
# of satellites in standby/storage orbit status	3/3 (9,11, 12)	3 (9,11,12)	3 (9*,11)	2 (9*11,N)	2 (11, N)	1 (N)
# of satellite launches	1/1 (M,12)	0	0	1 (N, 13))	0	0

NESDIS is responsible for the operation and maintenance of the GOES ground systems. Primary responsibilities fall into three categories: satellite health and safety; meteorological data reception and dissemination; and data archiving. The NESDIS Satellite Operations Control Center (SOCC) in Suitland, MD monitors and controls the spacecraft via the two 16.4-meter and two 18-meter transmit/receive antennas located at the Wallops Command and Data Acquisition Station (WCDAS) in Wallops, Virginia. Raw meteorological data is received and pre-processed at the WCDAS for retransmission via the GOES satellites to primary end users like the National Weather Service (NWS) Field Service Stations. SOCC is equipped with receive-only antennas for ingest of the pre-processed, re-transmitted instrument data from WCDAS. The Wallops facility is also equipped to perform many of SOCC's functions in case of a SOCC failure. In case of a transmitting antennae failure, a Wallops Backup (WBU) facility is located at NASA Goddard Space Flight Center in Greenbelt, MD, capable of fully operating a single satellite.

The GOES ground system IT architecture basically consists of three parts: Replacement Telemetry Acquisition and Command Transmission System (RTACTS); the GOES I-M Telemetry and Command System (GIMTACS); and the Operations Ground Equipment (OGE). RTACTS is collocated with the antennas and converts satellites RF signals into digital data for the ground system computers, and converts ground station commands to RF for upload to the satellite. GIMTACS handles all spacecraft health and safety checks, commanding of the spacecraft, daily schedule generation, and spacecraft engineering analysis and trending functions. The OGE generates and monitors the quality of the pre-processed instrument data; determines spacecraft orbit and attitude; provides instrument calibration data; and provides navigational inputs. The OGE consists of five subparts: the OGE Data Acquisition and Patching System (ODAPS); Sensor Processing System (SPS); Replacement Product Monitor (RPM); Orbit and Attitude Tracking System (OATS); and OGE Input Simulator (OIS).

The GOES ground system physical IT architecture is a mixture of DEC VAX and Alpha servers, Sun Solaris servers, Modcomp mini-computers, MTI RAIDS in a DEC hub and CISCO Local-Area- Network arrangement. Windows-NT workstations for spacecraft controllers, schedulers, and engineers are also connected to the DEC hub, and Sun workstations support off-line engineering analysis and quality monitoring functions. SOCC, the WCDAS, and WBU are connected via a diversly-routed, multiple T-1 Wide-Area-Network.

System Status and Plans - GOES 8 and 10 are currently providing operational geostationary coverage. GOES 8 is anticipated to run out of fuel in the December 2002 time frame, and to provide usable data into CY 2003. GOES 10, launched in April 1997, was serving as an on-orbit spare until July 1998 when it was placed in operation to replace GOES 9. Due to operational problems, GOES 9 was placed in storage in August 1998 as a spare with limited capability. The GOES 11 was launched in May 2000; after checkout it reestablished the GOES constellation with a full-capability on-orbit spare. GOES 8 will be replaced by GOES 12. GOES 12 was launched in July 2001 and was placed in a stand-by orbit in December 2001, following completion of its post-launch check-out. GOES 12 is particularly important as it carries the new prototype Solar X-ray Imager (SXI) instrument onboard.

The ground system must be prepared for the next generation of GOES satellites, "N-series." The new Spacecraft Support Ground System (SSGS) was delivered to NESDIS in April 2001. Initial testing of the SSGS is complete, and the first of a series of remote tests with the GOES N spacecraft at its manufacturing location have been successfully executed. Three additional software deliveries are scheduled for FY 2002 and FY 2003 to complete the full functionality required of the SSGS.

Life cycle studies are in progress to revise the cost estimates for maintaining/storing GOES satellites, including procedures for prioritizing GOES satellite ground system enhancements to reduce risk.

NESDIS is partnering with NASA Langly Research Center (LaRC) and the Department of the Navy (DON) in the Geosynchronous Imaging Fourier Transfer Spectrometer (GIFTS) program to prepare for the Advanced Baseline Imager (ABI) and Advanced Baseline Sounder (ABS) instruments planned for the GOES-R series of satellites. NESDIS will support the mission with

dedicated X-band reception at the WCDAS, Level 0 to 1 instrument and health/safety data processing, and archiving of data for post calibration/validation purposes. WCDAS will also be the back-up command and control facility.

NESDIS is continuing to ingest and distribute data from the Advanced Composition Explorer (ACE), a NASA solar monitoring mission, in partnership with sites in Japan and England. Severe geomagnetic storms cause communications problems, abruptly increase drag on spacecraft, and can cause electric utility blackouts over a wide area. The location of ACE at the L1 libration point between the earth and the sun enables ACE to give about a one hour advance warning of impending geomagnetic activity. Similar instruments are planned for the later GOES satellites and this is a good opportunity to gain experience with these instruments before they become operational. Data is processed for the Unites States at the NOAA Space Environment Center in Boulder, CO and distributed to civilian and military users.

NESDIS is also continuing ingest and distribution of METEOSAT data, and is installing new receive equipment at WCDAS in FY 2003 to receive METEOSAT Second Generation (MSG) data.

GOES Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Date Recovery Rate (metric = percentage)	98/98	98	98	98	98	98
Maximum continuous downtime (metric = hours)	0/6	6	6	6	6	6

*When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

GOES I-M Ground System Milestones	FY Goal	Completion/ Revised Goal
Professional Support Services (PSS) recompete contract awarded	FY 01	FY 01
Replacement OGE Product Monitor becomes operational	FY 01	FY 02
Wallops Backup at GSFC becomes operational	FY 01	FY 01
Upgrade GIMTACS workstations	FY 01	FY 03
GOES simulator rehost complete	FY 01	FY 01
Telemetry archive complete (GOES Archive Server) (mid Oct 01 latest)	FY 01	FY 02
Replacement GIMTACS TACTS becomes operational	FY 01	FY 01

GOES I-M Ground System Milestones	FY Goal	Completion/ Revised Goal
LRIT Upgrades Complete	FY 02	
DAPS replacement complete	FY 02	
TCP/IP Implementation complete (Replacement of X.25 - still doing requirements definition - PSS special project)	FY 02	FY 03
SOCC move to NOAA Satellite Operations Facility starts	FY 03	FY 04
SOCC CDA 3C telemetry automation complete	FY 08	

GOES N-R Ground System Milestones	FY Goal	Completion/ Revised Goal
GOES NO/P/Q ground systems development begins	FY 01	FY 01
GOES NO/P/Q Software Services contract awarded	FY 01	FY 01
Professional Support Services (PSS) recompete contract awarded	FY 01	FY 01
METEOSAT Data Ingest	FY 01	FY 01
ORA Product Development	Ongoing	
ACE Data Ingest	FY 03	
DCS CDMA Upgrade	FY 03	
GOES NO/P/Q ground system - acceptance	FY 03	
GIFTS ground system development	FY 03	
SOCC move to NOAA Satellite Operations Facility starts	FY 03	FY 04
GOES N launch	FY 04	
SOCC move to NOAA Satellite Operations Facility complete	FY 05	
GIFTS Launch	FY 05	
GOES O launch	FY 07	
GOES P launch	FY 08	
GOES R launch	FY 12	

Forecast Systems Laboratory (FSL) High Performance Computing System (HPCS): As NOAA moves forward, it will require substantial increases in computing resources in order to address its mission of describing and predicting the physical, chemical, and biological makeup of the earth and its environment. Commodity-based cluster computers promise to provide the most cost-effective computer power available to meet requirements. Although many of NOAA's applications are ideally suited to the cluster architecture, a substantial effort is still required to develop applications and procedures to make this transition.

FSL anticipates beginning procurement of the next high performance system in late in FY 2002 for contract award in FY 2004.

The mission of the laboratory's Advanced Computing Branch (ACB) is to enable new advancements in atmospheric and oceanic sciences by making modern high-performance computers easier to use. Modern parallel supercomputers, typically composed of commodity off-the-shelf components, offer a less costly alternative to traditional vector supercomputers for the fast, efficient production of numerical forecasts. However, their use is different than the traditional vector supercomputers. To accomplish its mission, the ACB has developed software that simplifies the porting of numerical geophysical models from FSL, other OAR laboratories, the National Centers for Environmental Prediction (NCEP), and other organizations to modern parallel computing architectures. The culmination of this development is the Scalable Modeling System (SMS).

Using SMS, parallelism is added to a Fortran program by inserting directives in the form of Fortran comments. SMS then automatically translates this source code into parallel source code, inserting calls to SMS subroutines that perform interprocess communication and other parallel operations as needed. Since the directives are comments, a single source code can be maintained for both serial and parallel machines. Also, automatic source code translation allows complexity to be hidden from users to a greater degree than more traditional subroutine-based approaches.

The SMS subroutines form a software layer between the prediction model's source code and Message Passing Interface (MPI), the industry standard for interprocessor communication. This layered approach provides SMS users with ease of use, minimal impact to their source code, portability, and high performance. Source codes that include SMS directives are fully portable to most high-performance computers, Unix workstations, and symmetric multiprocessors (SMPs). SMS subroutines provide high-performance scalable I/O supporting both native and portable file formats. Also, data ordering in files is independent of the number of processors used. Further, since parallel operations are implemented as a layered set of routines, machine-dependent optimizations have been made inside SMS without impacting the model source code. SMS also supports many user-specified optimizations. For example, the execution of redundant computations to avoid time-consuming interprocessor communication will reduce run times in some cases. SMS also provides tools to assist in testing and debugging of parallel programs.

Several atmospheric and oceanic analysis and prediction models have been parallelized using SMS, including: Quasi-nonhydrostatic (FSL), Rapid Update Cycle (FSL), Local Analysis and

Prediction System (FSL), Regional Ocean Modeling System (Rutgers University/UCLA, Pacific Marine Environment Laboratory), Global Forecast System (Central Weather Bureau, Taiwan), Typhoon Forecast System (Central Weather Bureau, Taiwan), NALROM (Aeronomy Laboratory), Princeton Ocean Model (Environmental Technology Laboratory), Hybrid Coordinate Ocean Model (Los Alamos National Laboratory/University of Miami), and Eta (NCEP). Computer architectures supported by the SMS include the IBM SP2, Cray T3E, SGI Origin 3000, Sun E10000, HP Exemplar, Linux clusters (both Intel and Compaq Alpha), and other Unix workstations and SMPs.

FSL has acquired a commodity-based cluster with an initial peak speed of approximately 0.34 teraflop and a 10-20% sustainable performance for running finite-difference models of the atmosphere and ocean. In FY 2001, the peak speed was increased to .8 teraflop, increasing to a peak speed of 14.2 teraflops by FY 2003. This system, with significantly improved processing speed, has been made available as a resource to all of NOAA for developing and testing high-resolution models capable of depicting the detailed nature of weather systems, climate change, and ocean circulations. Current projects from outside FSL include: a three-dimensional photochemical-transport model is used to produce numerical simulations of the transport of tracers and chemical species within stratosphere-troposphere exchange events, as a means of predicting troposphere and lower stratospheric compositions (NOAA/AL); using the Regional Ocean Modeling System (ROMS) model to study the impact of interannual-to-decadal changes in circulation and hydrography on lower trophic level dynamics, fisheries, and sea lions in the Northeast Pacific (NOAA/PMEL); and the construction of the first space weather climatology for 1990 - 2000 using data-driven space weather models (NOAA/NGDC). The FSL system will serve as the technology platform for major NOAA developmental activities. Utilizing this new computer resource, FSL will:

- Support the North American Observing System (NAOS) Program, taking the lead role in the scientific assessment of current and proposed future observing systems to work toward a more cost-effective mix of observing systems;

- Continue the development of the high-level software library, SMS, to ease the conversion process of software routines from the traditional shared-memory machine to massively-parallel scalable architecture; and

- Continue to collaborate with NCEP and other organizations and university groups on developing the next-generation state-of-the-art mesoscale weather prediction model that will be used in both operations and research (the Weather Research and Forecasting (WRF) model).

System Status and Plans - The FSL HPCS currently has 564 Compaq/Alpha processors. To improve system stability, the processors were divided into four logical units, allowing the near isolation of critical quasi-operational jobs, including the backup of the Rapid Update Cycle (RUC) model that is running at NCEP. The WRF model was ported to the HPCS and evaluation of LIDAR data under the auspices of the NAOS program were conducted. Testing of the Intel Architecture was conducted in preparation for the final upgrade of the system. The final upgrade of the existing system will consist of 768 dual-processor Intel 2.2 GHz Xeon nodes to be

delivered in two stages. Two small configurations of 64-node clusters will be delivered in June, 2002, followed by three larger systems configured as one 128-node cluster and two 256-node clusters in August, 2002. In the spring of 2003, an IA64 testbed system will be delivered so that FSL can begin to test the newest technology in preparation of the next system procurement.

The procurement for the next system will begin late in FY 2002 for contract award in FY 2004. As a technology transfer laboratory, FSL's mission is to study new computer technologies for application to operations. It is expected that the next system will again allow FSL to examine commodity-based multiprocessor systems. More study needs to be conducted in the storage, I/O, and queuing system aspects of this type of technology. Additionally, further research into the applicability of Storage Area Networks as applied to the quasi-operational scientific environment needs to be conducted.

FSL HPCC Performance Measures*	**FY 01**	**FY 02**	**FY 03**	**FY 04**	**FY 05**	**FY 06**
Run MM5 with coupled chemistry on 27km grid over eastern and central U.S. to make real-time ozone forecasts		x				
Run WRF model with coupled chemistry on a 27km resolution grid over the eastern and central U.S. to make real-time ozone forecasts			x			
Number of non-FSL projects supported *[new measure]*		17	15	15	15	15
SMS Improvements						
Annual # of new features released to the public domain	3/2	2	2	1	1	
Annual # of new computer architectures supported**	1					
Use SMS to parallelize oceanic and atmospheric prediction models for NASA's Goddard Space Flight Center and Los Alamos National Laboratory		x				
Enhance SMS to support all Fortan90 syntax			x			
NAOS Observing System Improvements						

FSL HPCC Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Annual # of observing system configurations evaluated***	3	3	3	3	3	
Develop (with others) a high-resolution non-hydrostatic community mesoscale model						
Annual # of additional applications capable of utilizing the new HPCS	2/1	2	2	2	2	

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement. The second number represents the measure presented in the FY 2000 -FY 2003 Strategic Information Technology Plan.
** The number of new computer architectures supported by SMS is no longer a relevant measure due to the dwindling number of computer architectures available for work of this type. SMS will continued to be ported to any new architectures that will be used for scientific computing in a multi-processor environment.
***NAOS cannot adequately be measured by simply enumerating configurations. Instead, specific data studies are funded and evaluations are carried out as appropriate.

FSL HPCC Milestones	FY Goal	Completion/ Revised Goal
Interim Upgrade	FY 01	FY 01
Begin Procurement Process for Followup	FY 02	FY 02
Final Upgrade	FY 02	
Quasi-Operational Runs of WRF model	FY 02	
Contract Award for Followup HPCS	FY 04	
Delivery of Followup HPCS	FY 04	

Central Environmental Satellite Computer System (CEMSCS): CEMSCS, operated by the NESDIS Office of Satellite Data Processing and Distribution, is NOAA's primary data-processing system for the Nation's environmental satellite data. CEMSCS ingests environmental data from NOAA's polar and geostationary spacecraft, and produces environmental products and parameters such as vertical atmospheric measurements (soundings), low-level wind vectors, and sea-surface temperatures. These data and products are critical inputs to NWS analyses and forecast models. The system is also used for satellite image production and serves as the host system for the digital satellite data archive. Although the primary uses for NESDIS polar-orbiting satellite products are as inputs to the forecasts and warnings provided by

CEMSCS is the central processing system for environmental satellite data. Upgrades will be needed to support requirements from new satellites and instruments.

NWS, these satellite data are also used in many other environmental information contexts by numerous Federal agencies, state governments, and the public and private sector. These uses include analyzing climate change; detecting volcanic eruptions and wilderness fires and tracking associated dust clouds; and monitoring the health of vegetation, the growth of deserts, and deforestation. CEMSCS also ingests and processes data from non-NOAA satellites to produce products to support protection, restoration, and sustainable use of coastal and oceanic ecosystems.

CEMSCS has established a modern distributed-processing architecture to support the many different types of products that will be generated from the datasets created by new satellite systems (NOAA M-N-N', METOP, GOES M, ADEOS, Radarsat, and EOS). The CEMSCS architecture consists of powerful alternative platforms (i.e. servers and workstations) attached to an enterprise server in a client/server configuration. The enterprise server acts as a clearinghouse or traffic cop for data transfer to alternative processing platforms, as well as data and product distribution to a wide range of customers in the environmental studies, climatic research and meteorological communities world-wide. The primary computing platform is the Amdahl GS735 enterprise server using the Open Systems/390 (OS/390) operating system. An example of one of the alternate platforms is a Cray J916 processor that produces the Advanced TIROS Operational Vertical Soundings (ATOVS) from the advanced suite of instruments on the NOAA-15 satellite.

This activity supports the NOAA strategic goal to "Advance Short-Term Warning and Forecast Services" by providing products from polar and geostationary satellites, enhancing the capabilities to meet the objectives of a modernized NWS, and to aid forecasters in providing more precise and timely forecasts.

System Status and Plans - Market research was conducted to determine the best vendor to provide a Front End Processor (FEP) replacement for the CEMSCS and to determine the Information Processing Division's (IPD) communication requirements. Two vendors were recommended by the study. A best value study is planned to determine which of these two vendors is the best choice for this task. The replacement FEP is scheduled to be purchased in May or June of FY 2002 at a cost of $500,000.

Other upgrades include increased backup capability and a server node for a whiteboard. The increase in back-up capability required the purchase of additional licenses for Legato. The cost of these licenses will be $7,650. The whiteboard requires the purchase of a server node at the cost of approximately $70,000.

In addition to hardware and off-the-shelf software, enhancements are being made to the Ingest and Preprocessor software. These enhancements are to enable the ingest and preprocessing of the MetOP Initial Joint Polar-orbiting System (IJPS)-era data. In FY 2002, $1,020,000 will be spent on this effort.

The CEMSCS remains a viable operational production architecture for the current base-lined requirements.

Successful development to process, in near-real-time, Moderate Resolution Imaging Spectroradiometer (MODIS) data from NASA's Earth Observing System (EOS) satellite, Terra, was achieved beginning in February 2000. Global processing through level 2 products for land, atmosphere, and ocean are routinely produced and made available to quality control partners for analysis as well as the National Fire Service, Air Force, and NASA's Rapidfire program for inclusion in products which require near-real-time data. Modifications have been made to the system to process MODIS data from a second satellite AQUA, which was launched May 4, 2002. Distribution of data continues to be a problem as the project and the receivers of the data slowly upgrade their technology in both network speed and data storage capacity. This project continues to be a prototype project as it pushes the edge of technology in processing speed and storage of voluminous data sets which have surpassed previous standards. The NPP/NPOESS (NPOESS Preparatory Project/National Polar Orbiting Environmental Satellite System) has a vested interest in the results that are acquired from this project in the form of risk reduction towards these future projects in term sof processing capacity, large data storage systems, and network transfer requirements.

The QuikSCAT Mission is a quick response to the loss of the NSCAT instrument on the NASDA ADEOS spacecraft. It was launched on June 19, 1999 and is now processing SeaWinds scatterometer data as of February 2000 from the QuikSCAT system using the processing modules developed by JPL. The SeaWinds data is available in BUFR format to the user community. In addition to the originally planned ocean winds products, several new products have been added to the processing stream on an experimental basis and have been made available to the user community. These include daily ice image products being used by the National Ice Center, a lite, winds-only, product for the marine community, and experimental high resolution wind retrieval and image products. One of the most anticipated changes for the QuikSCAT processing system is the launch of a second Seawinds instrument on the NASDA Adeos-II spacecraft scheduled for November 2002. The result will be a second QuikSCAT data stream to be processed in near-real-time. Efforts are underway to develop the near-real-time Adeos-II processing system and to integrate it with the current operational QuikSCAT processing system.

The NOAA-N satellite is scheduled to be launched in June 2004 and the NOAA/EUMETSAT Meteorological Operational (METOP-1) satellite in December 2005. Satellite Processing will have the capability of processing all instruments from NOAA-N and METOP-1 to Level-1 at day-one launch. In addition, the METOP instrument GOME will be taken to Level-2 (ozone products). Additionally, requirements for products from the Infrared Atmospheric Sounding Interferometer (IASI), Global positioning system Receiver for Atmospheric Sounding (GRAS), and Advanced Scatterometer (ASCAT) instruments need to be identified and refined.

In FY 2003 software development for Metop will continue, plus planned hardware upgrades to bring the IBM RS/6000/SP to the operational configuration (extra nodes, operator monitoring system, networking). In addition, there are plans to purchase a secure server to house white board software for the joint collaboration between the IPD Metop team and the EUMETSAT counterparts. Last is hiring of a senior systems analyst to aid the existing team in designing an activity control system, which will be needed for all functional areas to use pipeline processing.

In FY 2004 software development for Metop will continue. In addition, we plan to upgrade the FEP/Ingestor for the Consultative Committee for Space Data Systems (CCSDS).

CEMSCS Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Scheduled customer required environmental GOES observations transmitted to customers in near real-time. Metric: Percentage	98.5%/ 98.5 %	98.5%/ 98.5%	98.5%	98.5%	98.5%	98.5%
Ninety-eight and one-half (98.5) percent of environmental Polar Satellite data transmitted to all customers within a specified time from the time satellite acquired data. Metric: minutes	120/120	120/120	120	120	120	120
Scheduled customer required DMSP data transmitted to the customer within 10 minutes from the satellite acquired the data Metric: Percentage	99%/ 99%	99%/ 99%	99%	99%	99%	99%
On-line product delivery	99%/ 99%	99%/ 99%	99%	99%	99%	99%
98% POES data is available, it is processed and transmitted to customers within specified time limits Metric: minutes	45/45	45/45	45	45	45	45
Total annual number of Global Temperature and Water Vapor Profiles collected ATOVS, SSMT1, SSMT2	3.2M/ 3.2M	3.2M/ 3.2M	3.2M	3.2M	3.2M	3.2M
Total annual number of Global Ocean Surface Winds products	1.2M/ 1.2M	1.2M/ 1.2M	1.2M	1.2M	1.2M	1.2M

*When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

CEMSCS Milestones	FY Goal	Completion/ Revised Goal
CEMSCS upgrades for ROBOTICS	FY 02	FY 02
CEMSCS upgrades for METOP Processing	FY 02	FY 02
Initial CEMSCS upgrades for IT Security	FY03	
Cooperative European METOP Satellite Products Operational	FY 04	
NPOESS Preparatory Products	FY 04	
METOP Instrument Products Operational (Non-NOAA)	FY 04	
Next Generation NOAA-N' Products Operational	FY 05	

Polar-orbiting Operational Environmental Satellites (POES) Ground System:

Through meteorological monitoring of the Earth, POES supports the NOAA strategic goal to "Advance Short-Term Warning and Forecast Services." NOAA polar-orbiting satellites provide global and local coverage for collecting meteorological data used in predicting, monitoring, and observing trends of weather and climate. Polar satellites provide real-time weather data used to develop short-term weather forecasts and to provide a continuous data archive for long-term climate studies ranging from the vegetation index to monitoring the ozone layer, as well as providing data collection and search and rescue services.

The POES ground system monitors and controls NOAA's polar-orbiting environmental satellites. System changes are needed to support future satellite systems and the relocation of the SOCC facility.

On May 5, 1994, President Clinton made the decision to merge the United States military and civil operational meteorological polar satellite systems into a single, national system. The Defense Meteorological Satellite Program (DMSP) and the NOAA Polar [Orbiting] Operational Environmental Satellite (POES) program will be converged into the unified National Polar-orbiting Operational Environmental Satellite System (NPOESS) with a first launch scheduled for 2007. At present, two DMSP satellites are maintained in an operational orbit. In a first step toward the NPOESS convergence, special-purpose components of the DMSP telemetry and command system have been relocated to NESDIS Satellite Operations Control Center (SOCC) and incorporated into a new telemetry and control system paralleling the POES Polar Acquisition and Command System (PACS). The new DMSP system is named Integrated Polar Acquisition and Command System (IPACS). A similar IPACS configuration is installed at Schriever Air Force Base in Colorado as backup for the SOCC's IPACS system.

Capitalizing upon the existing POES program, an agreement is in place between NOAA and EUMETSAT (European Organization for the Exploitation of Meteorological Satellites) on the

Initial Joint Polar System (IJPS). This program will include two series of independent, but fully coordinated, NOAA and EUMETSAT satellites, exchange of instruments and global data, cooperation in algorithm development, and plans for real-time direct broadcasts. Under terms of the IJPS agreement, NOAA will provide the satellites for flight in the P.M. orbit and EUMETSAT will provide the satellites for flight in the A.M. orbit. All satellites will have a common core set of meteorological instruments. The METOP (Meteorological Operational) satellite will serve as the A.M. satellite for the U.S. civilian polar orbiting mission. The first of the IJPS satellites, METOP-1, is scheduled for launch in FY 2005.

NESDIS is responsible for the operation and maintenance of both the NOAA and DMSP ground systems. Primary responsibilities fall into three categories: satellite health and safety; meteorological data reception and dissemination; and data archiving. Since the NESDIS SOCC in Suitland, MD is equipped with just receive-only antennas, SOCC monitors and controls the spacecraft via antennas located at the Wallops Command and Data Acquisition Station (CDAS) in Wallops, VA (WCDAS), and the Fairbanks CDAS in Fairbanks, AK (FCDAS). The Wallops facility is also equipped to perform many of SOCC's functions in case of a failure.

The POES ground system physical IT architecture is a mixture of DEC VAX and Alpha servers, and a Sun Solaris server in a DEC hub arrangement on a CISCO Local-Area Network. Workstations for controllers, schedulers, programmers, and engineers are also connected to the DEC hub. SOCC and the CDASs are connected via a CISCO Wide-Area-Network.

Launches are scheduled to replace aging satellites in order to maintain two operational polar satellites in orbit at all times - the A.M. satellite crossing the equator at a morning local time, and the P.M. satellite crossing the equator at an afternoon time. Newly launched satellites are considered secondary until they become operational. Operational satellites are replaced by newly launched secondary satellites when their instruments degrade to a substandard state or the orbit has drifted to an unacceptable nodal crossing time. The degraded secondary satellites are left in orbit to provide Data Collection System (Argos), SARSAT (Search and Rescue Satellite-Aided Tracking), and transponder services, plus any other working instruments readings as available. At present, three POES satellites are in secondary configurations, of which only one is considered operational. The table below shows in parenthesis the number/letter for the satellites included in the count. The number of satellites in the outyears may change if some of the degraded satellite instruments continue to function.

Polar Satellite Counts	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
# of NOAA satellites in operational status	2/2 (15,16)	2 (15,16)	2 (15,16)	2 (M,16)	2 (M,16)	1 (N)
# of NOAA satellites in secondary status	4/4 (9,11, 12,14)	4 (11,12, 14,M)	2 (14,M)	2 (15,N)	2 (15,N)	2 (M,16)
# of METOP satellites in operational status	-	-	-	-	1 (Metop 1)	1 (Metop 1)

Polar Satellite Counts	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
# of NOAA/Metop satellite launches	1/1 (L,16)	1 (M,17)	0	1 (N,18)	1 (Metop 1)	1 (NPP)

System Status and Plans - The launch of NOAA-M in 2002, NOAA-N in 2004, NOAA-N' in 2008, and the European Metop-1 satellite in 2005 are key events. All require upgrades to the data ingest, and product generation and distribution systems.

Final preparations for NOAA-M are underway. NOAA-M is scheduled for launch in late June 2002. Once NOAA-M is operational, the ground system will be prepared for NOAA-N. Ground system preparations typically start approximately two years in advance of the launch date.

The European Metop satellite will serve as the morning polar-orbiting satellite for the United States. NOAA-N and its successor, NOAA-N', will serve as the afternoon satellite. The NESDIS ground systems must be upgraded to acquire and forward METOP instrument data and incorporate it into the U.S. suite of products. To support METOP, the FCDAS and WCDAS will require new communications, archiving, and RF equipment peculiar to the METOP data format and RF band. The Suitland SOCC will require new communications equipment to forward the METOP data streams to the data processing systems. The ground system will also have to be changed to accommodate instrument and data dissemination related changes associated with the NOAA-N and NOAA-N' satellites. The IJPS related upgrades will start in FY 2003.

The ground system must also be prepared for NPOESS. A new ground system will need to be developed to support NPOESS satellites. To support NPOESS convergence, a new Mission Planning and Scheduling Subsystem is under development for the operation of DSMP satellites. A detailed schedule for these upgrades will be available after the award of the NPOESS contract by IPO. The predecessor to NPOESS, NPP, will launch in FY 2005 and upgrades to the ground system will start in FY 2003. As a risk reduction for the NPOESS satellite altimeter program, NOAA is planning to assume responsibility for the ground system of the NASA Jason-1 satellite altimeter in FY 2003. The first NPOESS satellite does not launch until FY 2008 at the earliest.

The SOCC facility is currently located in Federal Building-#4 (FB-#4) at the Suitland Federal Center in Suitland, MD, but NESDIS plans to relocate the SOCC facility to NOAA Satellite Operations Facility (NSOF) in FY 2005. Planning is in its early stages, but significant IT dollars will be required for the relocation effort.

POES Performance Measures	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Data recovery Rate (%)	98/98	98	98	98	98	98
Maximum continuous downtime (hours)	0/6	6	6	6	6	6

POES Milestones	FY Goal	Completion/ Revised Goal
Professional Support Services (PSS) Contract Award	FY 01	FY 01
Operations Intranet Operational System Development	FY 01	FY 01
PACS Development Rail Complete	FY 01	FY 01
SOCC Expansion Complete	FY 01	FY 02
NOAA-M launch	FY 02	
Delivery of instruments to EUMETSAT for Metop spacecraft	FY 01-FY0 3	
Transfer of Jason-1 to NOAA	FY 03	
Communications for Metop data exchange	FY 04	
Antenna upgrade at Fairbanks for Metop	FY 04	
Communications upgrade for Metop	FY 04	
NOAA-N launch	FY 04	
Fairbanks and Wallops Metop Initial Operational Capability	FY 05	
SOCC move to NOAA Satellite Operations Facility starts	FY 05	
Metop-1 launch	FY 05	
NPOESS Preparatory Program (NPP) launch	FY 06	
Jason-2 launch	FY 06	
NOAA-N' launch	FY 08	
SOCC - CDA 3C telemetry automation complete	FY 08	
Metop-2 launch	FY 11	

Satellite Environmental Processing System (SATEPS) - NESDIS is responsible for the civilian operational remote sensing of the Earth, which includes the Geostationary Operational Environmental Satellites (GOES) and the associated data receiving, processing, and distribution functions. The Office of Satellite Data Processing and Distribution (OSDPD) Satellite Services Division (SSD) also integrates new products and data sources into the distributed computing environment known as the Satellite Environmental Processing System (SATEPS). The SSD serves as the primary interface between NESDIS and geostationary environmental satellite data users. SSD is responsible for providing data, analyses, and interpretations for geostationary and polar data. Some NOAA/Polar and the European and Japanese geostationary weather satellite data are also distributed through the SATEPS network, but the majority of these data are processed outside of the SATEPS.

SATEPS is a client/server workstation/PC platform environment which supports the continuous (24 hours per day and 7 days per week) flow of data for the highly visible NESDIS mission of protecting life and property.

SATEPS is a client/server workstation/PC platform environment which supports the continuous (24 hours per day and 7 days per week) flow of data for the highly visible NESDIS mission of protecting life and property. This facilitates the real-time processing and file transfer to server systems of raw data and remapped areas, which may be accessed within one to three minutes of the end of the transmission, even for the large, full-disk, one kilometer-resolution visible data. Volcano hazard alerts and flash flood analyses are issued faster due to earlier available raw data and faster product processing.

The flow of geostationary satellite data from the SSD feeds the essential NWS processes that forecast life and property weather events and warnings to United States citizens and to individuals around the world. The satellite data is essential for NWS forecasts and safeguarding life and property of citizenry against tornadoes, flash floods, hurricanes, winter storms, and volcanos, and as a primary source of satellite data used in climatic analysis, in support of the NOAA strategic goal of "Advance Short-Term Warning and Forecast Services."

System Status and Plans - SSD requires a complex network of dedicated communications lines and associated equipment to facilitates the receipt and relay of the large volumes satellite data, products, and services.

In accordance with our IT architecture structure plan of a PC-based environment, we are replacing old RISC-based UNIX workstations purchased in early 1994 and 1995. These aged systems are starting to have more hardware problems and are becoming more expensive to repair. Replacement systems were purchased, installed. and the functions are being ported to the new systems. All new systems have been implemented in the production environment, thus meeting schedule, cost and system performance goals and thereby supporting the redesign and simplification of our work processes.

During FY 2002 we are currently taking delivery of upgrades to hardware and telecommunication equipment to support new satellites and new operational products. The installation and implementation of the new equipment and software will take place in the third and fourth quarters of 2002.

During the next five years, OSDPD will continue to implement additional weather products at the request of the NWS and further improve the existing products. The launch of new NOAA satellites and the acquisition of improved data streams from foreign satellites (e.g., Japan's GMS, Europe's METEOSAT, China's FY2, Russia's GOMS, etc.) will also augment the SATEPS environment.

Technology refreshments and routine equipment and software upgrades are required as additional satellites are made available. If no more satellites are launched or otherwise come available, the SSD would have no need to upgrade its SATEPS environment, and therefore would maintain the status-quo. Development costs will cover preparation for new satellites and new weather products only.

SATEPS Performance Measures below are given in a percent of success.

SATEPS Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
GOES - 8 Image Ingest	99.88/ 100%	100%	100%	100%	100%	100%
GOES - 10 Image Ingest	99.92/ 100%	100%	100%	100%	100%	100%
Meteosat 7 Image Ingest	99.53/ 100%	100%	100%	100%	100%	100%
GOES - 8 Imager ASOS Products	99.72/ 100%	100%	100%	100%	100%	100%
GOES - 10 Imager ASOS Products	99.93/ 100%	100%	100%	100%	100%	100%
GMS Imager Ingest	99.79/ 100%	100%	100%	100%	100%	100%
GOES - 8 Sounder	100/ 100%	100%	100%	100%	100%	100%
GOES - 10 Sounder	99.98/ 100%	100%	100%	100%	100%	100%
GOES - 8 Moisture Soundings	99.93/ 100%	100%	100%	100%	100%	100%

SATEPS Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
GOES - 10 Moisture Sounding	99.91/ 100%	100%	100%	100%	100%	100%
GOES - 8 ASOS Satellite Cloud Products	99.93/ 100%	100%	100%	100%	100%	100%
GOES- 10 ASOS Satellite Cloud Products	99.89/ 100%	100%	100%	100%	100%	100%
GOES - 8 Imager Derived Precipitation Imagery	99.90/ 100%	100%	100%	100%	100%	100%
GOES - 10 Imager Derived Precipitation Imagery	99.79/ 100%	100%	100%	100%	100%	100%

*The first number before a slash indicates actual performance, the number behind the slash indicates the planned performance.

SATEPS Milestones	FY Goal	Completion/ Revised Goal
Upgrades to SATEPS hardware and software for receiving data from new Satellite.	FY 01	FY 01
Upgrade to SATEPS telecommunications to receive and distribute data from new Satellite.	FY 01	FY 01
Prepare new satellite products	FY 01	FY 01
Upgrades to SATEPS hardware and software for receiving data from new Satellite.	FY 02	
Upgrade to SATEPS telecommunications to receive and distribute data from new Satellite.	FY 02	
Prepare new satellite products	FY 02	
Upgrades to SATEPS hardware and software for receiving data from new Satellite.	FY 03	
Upgrade to SATEPS telecommunications to receive and distribute data from new Satellite.	FY 03	
Prepare new satellite products	FY 03	
Upgrades to SATEPS hardware and software for receiving data from new Satellite.	FY 04	

SATEPS Milestones	FY Goal	Completion/ Revised Goal
Upgrade to SATEPS telecommunications to receive and distribute data from new Satellite.	FY 04	
Prepare New satellite products.	FY 04	
Upgrade to SATEPS hardware and software for receiving data from new Satellite.	FY 05	
Upgrades to SATEPS telecommunications to receive and distribute data from new Satellite.	FY 05	
Prepare New satellite products.	FY 05	

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
AWIPS	Development/ enhancement	19,270	17,987	17,987	17,987	17,987	17,987	17,987
	Steady state	35,490	37,128	37,750	38,500	39,250	40,000	40,750
Weather and Climate Super-computing	Development/ enhancement	15,324	15,333	28,566	28,575	29,655	31,591	31,985
	Steady state	4,533	4,715	4,903	5,099	5,303	5,515	5,736
NEXRAD	Development/ enhancement	8,262	8,260	8,262	8,262	8,262	8,262	8,262
	Steady state	0	0	0	0	0	0	0

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
GOES Ground System	Development/ enhancement	5,835	7,719	14,912	13,961	3,478	4,014	11,605
	Steady state	1,221	610	624	389	2,355	5,395	688
NWS Gateway	Development/ enhancement	0	7,460	0	3,400	1,980	0	0
	Steady state	6,800	7,200	10,200	10,200	11,400	11,400	11,400
FSL HPCS	Development/ enhancement	3,351	3,391	3,446	3,351	3,000	3,000	3,000
	Steady state	400	435	470	900	900	900	900
CEMSCS	Development/ enhancement	3,597	3,796	4,029	5,554	6,943	8,679	10,849
	Steady state	6,976	7,393	7,794	7,794	8,184	8,593	9,023
POES	Development/ enhancement	3,605	3,694	6,361	9,420	3,555	2,279	1,598
	Steady State	1,196	610	624	389	1,975	3,810	2,310
SATEPS	Development/ enhancement	3,445	2,000	2,100	2,200	2,300	2,400	2,500
	Steady state	6,632	9,217	11,360	11,554	12,709	13,980	15,398

STRATEGIC GOAL: IMPLEMENT SEASONAL TO INTERANNUAL CLIMATE FORECASTS

The Programmatic Goal and Objectives: NOAA, working with academic and multi-national partners, will provide one-year lead-time forecasts of precipitation and surface temperature distributions. These forecasts will increase society's ability to mitigate economic losses and social disruption. The objectives set to accomplish this goal are to implement prediction systems, maintain and improve observing and data delivery systems, conduct research for improved climate predictions, deliver climate services, and assess socio-economic impacts. The primary Line/Program Offices involved in this goal are OAR, NWS, and NESDIS.

Satellite Active Archive: The NOAA Satellite Active Archive (SAA) is a digital library of near-real-time and historical satellite data from NOAA's Polar-orbiting Operational Environmental Satellites (POES) and other non-NOAA satellites. Data from the SAA support a broad range of environmental monitoring applications, including weather analysis and forecasting, climate research and prediction, global sea-surface temperature measurements, atmospheric soundings of temperature and humidity, ocean dynamics research, volcanic eruption monitoring, forest fire detection, and global vegetation analysis. The system allows users to search an inventory database and browse selected datasets, preview sub-sampled Earth images of that data, and order the data for electronic delivery on the Internet or on computer-compatible media for further processing and analysis. The SAA services a wide user-base (other Government agencies, the private sector, academia, the secondary educational community, and the general public), thereby significantly improving NOAA's delivery of products and services to its customers.

The SAA is a digital library of near-real-time and historical satellite data. The system is operational. The amount of data available will be doubled and software will be upgraded.

The SAA supports NOAA's strategic goal to "Implement Seasonal to Interannual Climate Forecasts" by providing data for research in this area. Given the planned additional datasets, the SAA will also support most of the other six goals, especially to "Predict and Assess Decadal-to-Centennial Change" and to "Sustain Healthy Coasts".

System Status and Plans - The SAA is a fully operational system. In FY 2001 the SAA electronically distributed more than 10 Terabytes of polar satellite data, SAR (Synthetic Aperture Radar) data, and derived data products to its customers. The volume of data distributed each month has been increasing by about 100 GB. The SAA has more than 4.2 million data sets on-line, including 83% of all NOAA AVHRR (Advanced Very High Resolution Radiometer) and TOVS (TIROS Operational Vertical Sounder) data and DMSP (Defense Meteorological Satellite Program) data, and a 100% of all NOAA CoastWatch data. The SAA's Historic Information Processing (HIP) effort is populating the SAA near-line robotic library with NOAA

and DMSP data spanning calendar years 1978 to 1994. At the completion of this effort, all of these data will be available on-line through the SAA.

The current SAA Information Technology open system architecture is based on scientific workstations and near-line tape robotic storage system coupled to an enterprise server, the robotic storage being necessary to manage 60 terabytes of satellite data and imagery on digital tape media. The SAA plans to decouple the tape robotics storage system from the enterprise server, procure a 1.9 pedabyte tape robotics system, an eight terabyte disk storage area network system, and upgrade the current IBM servers in FY2002. The NESDIS goal for the next ten years is to expand the tape robotic storage system to make 10 pedabytes of data available electronically to customers. The workstations operating the system will also have to be continually upgraded to handle this increasing volume and complexity of data. The open-systems architecture allows incremental additions to be made and the system to be located on one or several different processors at one or more locations.

Enhancements currently being developed include the upgrade of the ingest process to ingest almost any new climatic satellite-derived data product with minimal, if any, software changes. The complete revamping of SAA's Web site will consolidate the three sites currently supported by the SAA. Once implemented, the new site will allow for a better user interface, improved performance, easier maintenance, and data delivery from two sites (Washington D.C. - Suitland and Asheville, North Carolina - National Climatic Data Center).

SAA Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
% of U.S. POES archive on-line	85/85	95	100	100	100	100
Annual # of product datasets added	0/4	20/4	40/4	40/4	40	40
Monthly average data granules distributed	18,500/ 14,000	22,200/ 18,000	27,000/ 20,000	35,000/ 24,000	42,000	50,500
Monthly average data granules distributed (interactive orders)	-	22,200	27,000	35,000	42,000	50,500
Monthly average data granules distributed (subscription orders)	-	51,000	61,000	70,000	80,000	92,000
Monthly average data granules distributed (special bulk orders)	-	40,000	45,000	50,000	55,000	60,200
Monthly average data granules distributed (product data)	-	7,000	15,000	20,000	25,000	30,000

SAA Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Total monthly average data granules distributed (subscription and special bulk orders, product data)	-	129,200	148,000	175,000	202,000	242,700

*When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

SAA Milestones	FY Goal	Completion/ Revised Goal
NOAA-L data on-line	FY 00	FY 01
EOS Terra operational data on-line	FY 01	FY 03
RADARSAT follow-on data on-line	FY 01	FY 01
NOAA-M data on-line	FY 01	FY 02
EOS Aqua operational data on-line	FY 02	FY 03
Robotic archive expansion to 1.9 pedabytes	FY 02	FY 02
DMSP F16 data on-line	FY 02	
GOES data on-line	FY 03	
METOP-1 NOAA data on-line	FY 03	FY 05
Robotic archive expansion to 4.7 pedabytes	FY 03	FY 04
NOAA-N data on-line	FY 04	
NPP data on-line	FY 04	FY 05

Comprehensive Large Array-data Stewardship System (CLASS): NOAA spends almost a billion dollars each year on the observing systems that collect environmental data from all over the world. These data are used for a wide range of environmental prediction programs – from severe weather forecasting in which data must be used within minutes of collection, to climate prediction programs that use data from the past 100 years to project the climate over the next 100 years.

The CLASS project will implement efficient management of high volumes (petabytes) of data and automate the means of data ingest, quality control, and access.

NOAA's vast data holdings are collected and stored in various facilities, some of which are responsible for the perpetual stewardship, archiving, and dissemination of environmental data.

Today there are demands on virtually all of NOAA's programs to provide information on the health of the environment in real-time. For the 21st century, NOAA envisions that its data and information products will be available as part of an efficient and timely national decision-support system for the purpose of: (1) saving lives and protecting property; (2) promulgating public policy; (3) managing and conserving living marine resources; (4) enhancing the economic prosperity and quality of life in the United States; and (5) supporting the National and Homeland Security efforts.

No previous decade has seen the magnitude of changes in the volume of data coming into NOAA for processing and archive as those experienced in the 1990s. Already there are significant new volumes of data from the Department of Commerce/NOAA Next Generation Weather Radar (NEXRAD) and Department of Defense Meteorological Satellite Program (DMSP) being preserved as part of the NOAA archives. However, that explosive growth is nothing compared to what is expected between now and 2015. Even as current observing systems continue to provide data, new satellite systems such as the National Aeronautics and Space Administration (NASA) Earth Observing System (EOS), European Meteorological Operational (MetOp) satellite, and the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) will be going into operation within the next few years. In addition, the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and the next generation Geostationary Operational Environmental Satellite (GOES-R) will follow towards the end of this decade. These systems will provide orders of magnitude more data, which will present formidable challenges for NOAA. At the same time, new *in situ* observations from widely dispersed automatic reporting platforms are generating significant increases in conventional observation data to manage.

A large portion of the Nation's current archive of environmental data is stored and maintained by the National Climatic Data Center (NCDC), National Oceanographic Data Center (NODC), National Geophysical Data Center (NGDC), and the Satellite Active Archive (SAA). To prepare for the large increases in data volumes over the next 15 years, NOAA must increase the data-handling capacity and capabilities of its Data Centers. It must expand its current NASA/NOAA short-term archive project into a CLASS project which is fully operational and managed at the enterprise level. The CLASS project will afford efficient management of high volumes (petabytes) of data critical to the United States Global Change Research Program and scientific community. Management of these data requires a rapid expansion in storage capacity at the Data Centers and automating the means of data ingest, archive, quality control, and access.

In general, user requests increased throughout the 1990s. Although off-line data requests doubled, the truly exponential growth has been in the number of on-line users who extend far beyond NOAA's traditional user community. While on-line requests have increased, it is important to realize that only a portion of NOAA's data archive is available to the user on-line. As on-line access to NOAA's data expands, the user's average level of technical sophistication and scientific expertise is changing. On-line users are searching for information and answers to specific questions rather than for access to data. Users, no longer content to wait days for their data or information, are demanding on-line ordering, search, and browse capabilities with electronic file transfer for data delivery. New user groups require near-real-time access to data

to support decision-making and rapid response needs. Scientists and advisors have a critical need for long time-series of historical and recent environmental data to assess long-term trends, evaluate current status, and predict future conditions and events. The timeliness and completeness of the environmental records are crucial.

There is reason to expect that the information technology advances we have seen in the last ten years will continue for the foreseeable future. With these advances, NOAA has made significant progress in its ability to archive and provide access to its increasing data volumes, and will continue to leverage on these advancing technologies. Management of these data can be accomplished only through a rapid expansion in storage capacity, increased communications bandwidth, and automation of the means of data ingest, quality control, and access. The CLASS project will act as the connection in NOAA's effort to meet these challenges and pave the way to accommodate the additional massive data volumes expected over the next several years.

There are a number of aspects in the successful implementation of the CLASS project. First, there are those aspects which are purely mechanical or technical in nature. They include, for example, communicating the data from the source to the primary and backup storage locations; quality control and pre-processing of the data; storage of the data on media such as tapes and disk; and, post-processing the data to extract information. In addition, there are those issues concerning the virtual on-line search, discovery, retrieval, display, and customer order processing capabilities for the user community. All these various tasks must be accomplished securely, quickly, and efficiently to meet the needs of NOAA's user community.

Placing data on-line for easy, secure access via the World -Wide-Web is a high priority in accordance with the federal government's eGov initiative. Data storage and retrieval components will continue to be upgraded to support effective and efficient access with special focus on World- Wide-Web interfaces, emerging telephony technologies, and on-line data that support the objectives of the CLASS project concept of operations and ensure that the Nation has access (including Section 508 compliance) to their data and information.

Project Status and Plans - The ability to ensure on-going scientific stewardship for NOAA's environmental data and information will only be possible through extensive enhancement of NOAA's current data ingest, quality assurance, storage, retrieval, access, and migration capabilities. This CLASS project goal will be met through the development and implementation of a uniform archive management component, which will be integrated with a robust, large-volume, rapid-access storage and retrieval component capable of storing the incoming large array environmental data, *in situ* data, and operational products as well as receiving a user's on-line data request, automatically processing the request, and providing the requested data on the most appropriate media. The CLASS project will provide standardization in media, interfaces, formats, and processes. Additionally, the CLASS project will facilitate ongoing migration, preservation, and validation to new technology and media. CLASS is modular in design, built to integrate with automated real-time or near-real-time systems that deliver data. Transaction processing will be implemented to enable essentially autonomous operation and, where appropriate, to allow users to pay for data or services through credit card or automated billing.

The target architecture goal will, through life cycle replacements and upgrades, bring the current NOAA National Data Centers under a single archive and access architecture that will be under formal configuration management control. This will allow elimination of duplication of effort, minimize stand-alone systems, build the infrastructure to accommodate the large array data sets and reduce the overall operational and system maintenance costs. The foundation of CLASS is the highly successful and stable Satellite Active Archive (SAA). The SAA provides the maximum flexibility while minimizing development work and costs. The heart of the development centers on the upgrading of communications capabilities, increasing computer storage and power, use of commercially available modular hardware and software, and expansion of the World-Wide-Web access to the data and information through new or enhanced database management, search, discover, browse, order, and sub-setting techniques.

Each data source (e.g., EOS, GOES, etc.) is defined as a campaign within the CLASS project development effort. In addition to the overall enhancements to the baseline SAA necessary to handle the large increases in data volume, campaign-specific development efforts will take place to meet their specific requirements needs. To date, the SAA POES ingest software has been successfully installed and tested at NCDC for use with GOES data. The process to upgrade the telecommunications lines between Suitland and Asheville has been initiated. Contractor and Government development teams have been established in Boulder, CO (NGDC), Asheville, NC (NCDC), Suitland, MD (SAA), and Fairmont, WV.

CLASS Project Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Increase website accesses NESDIS-wide	10%/ 10%	10%	10%	10%	10%	10%
Increase availability of on-line NESDIS data sets and products	10%/ 10%	10%	10%	10%	10%	10%

*When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

CLASS Project Milestones	FY Goal	Completion/ Revised Goal
Enhance/upgrade/replace Data Center hardware to prepare for future data ingest activities	FY 01	Initiated/on-going
Upgrade Telecommunications capacity and quality - Phase 1	FY 01	FY 02
Develop detailed architecture	FY 02	
Select and acquire COTS e-commerce package for web portal	FY 02	
Design and develop CLASS web access portal	FY 02	

CLASS Project Milestones	FY Goal	Completion/ Revised Goal
Upgrade Telecommunications capacity and quality- Phase II	FY 02	FY 03
*Enhance/upgrade/replace Archive hardware to prepare for increased data ingest activities		
Develop data migration plan for EOS data from NASA	FY 03	FY 02
Implement initial operating capability of CLASS	FY 03	FY 02
Upgrade Telecommunications capacity and quality - Phase III	FY 03	FY 04
Full integration of the GOES campaign into CLASS	FY 04	
Implement and deploy hardware, software, and communications upgrades to accommodate Earth Observing System (EOS) satellite data	FY 04	
Implement retrospective EOS data recovery effort	FY 04	
Implement and deploy hardware, software, and communications upgrades to accommodate National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) satellite data.	FY 04	
Update and integrate emerging standards and technology study	FY 05	
Update and integrate CLASS IT refreshment plan	FY 05	
Update and integrate CLASS IT architecture plan	FY 05	
* This milestone has been combined with the first milestone. Enhancements, upgrades, and replacements that are project-wide will be an ongoing activity as new data campaigns are initiated. Specific campaign infrastructure enhancements, upgrades, and replacements will be listed separately.		

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
SAA	Development/ enhancement	0	3,020	1,675	2,205	3,191	1,510	1,510
	Steady state	0	1,400	1,500	1,600	1,700	1,800	1,900
CLASS	Development/ enhancement	1,995	3,600	6,600*	6,600	4,600	4,600	4,600
	Steady state	0	0	0	0	0	0	0

*Figures for FY 03 - FY 07 reflect funding for EOS.

STRATEGIC GOAL: PREDICT AND ASSESS DECADAL TO CENTENNIAL CHANGE

The Programmatic Goal and Objectives: NOAA will provide science-based options to support international policy and management decisions affecting the future of our global environment. A long-term climate record and a new generation of climate models are needed to predict and assess the climate impact of greenhouse gases trends and forcing agents, ozone-layer depletion and rehabilitation, and air-quality detection and improvement. Specific objectives will be to: characterize the forcing agents of climate change; understand the role of oceans in global change; guide the rehabilitation of the ozone layer; provide the scientific basis for improved air quality; and furnish prediction, assessment, and human-impact information. The primary Line or Program Offices involved in this goal are OAR, NESDIS, and the Office of Global Programs.

GFDL High-Performance Computing: GFDL scientists are working at the forefront of the climate and weather research community in the development and use of sophisticated numerical models to predict and understand atmospheric and oceanic phenomena. These research activities, which are critical to the Nation and to NOAA's ability to predict climate and weather behavior, rely on state-of-the-art computing capabilities. In addition, this research and model development will serve as a basis for GFDL and NOAA to provide climate information products to address the Nation's growing need for better science-based guidance on future climate change. GFDL has nearly 40 years of experience in acquiring, managing, and utilizing large-scale computing systems which are central to the success of the Laboratory's research mission.

GFDL plans to begin installation of a new system in FY 2004.

GFDL's high-performance computing plans address the laboratory's growing scientific computing needs through a strategy of continued incremental growth in computational and archival storage capacity. As GFDL's benefit/cost analyses of FY 1993 and FY 1998 indicate, increased system capacity produces important additional societal benefits that result from enhanced GFDL research capabilities, which include more sophisticated models and model physics, more comprehensive modeling experiments, and higher-resolution simulations. Recent GFDL accomplishments have translated into important breakthroughs in understanding of climate change, hurricane prediction, and successful simulation of the complex ocean-atmosphere system.

Recent concern about climate change and the 1997-98 El Niño event has spurred interest around the world, including the United States, for the development of national programs to improve climate prediction capabilities. However, the success of these efforts will depend heavily on physics-based climate modeling and fundamental climate science, two areas in which NOAA/GFDL scientists are among the world's leaders. A sharp increase in computing and archival capabilities was the remaining ingredient required to allow the Laboratory to attack the

very difficult problems confronting the climate research community and to support on-going and developing research collaborations within NOAA as well as with other government agencies, academic institutions, and research centers around the world. Efforts to address this critical need were the focus of GFDL's FY 2000 computer acquisition that will be discussed in the "System Status" Section that follows.

While mission-critical results from GFDL high-performance computing are realized in the laboratory's research accomplishments, the performance measures provided below are a valuable mechanism for tracking the lab's computing and model-development activities that are critical to the continued progress of the GFDL's research mission. The Milestones indicate important procurement events and major research goals that provide some indicators of the success of the GFDL computational initiative.

System Status and Plans - The GFDL High-Performance Computing System (HPCS) has been operational since April 2001 when it completed the 30-day acceptance test. The initial installed computational system consisted of a Large Scale Cluster (LSC) of eight SGI Origin 3800 nodes, each with 128 400 MHz MIPS processors and 64 GB of memory, and an Analysis Cluster (AC) of two Origin 3800 nodes, each with 64 400 MHz MIPS processors and 64 GB of memory. Because of installation delays of the initial system due to a worldwide shortage of integrated chips, the Raytheon Company, the prime contractor, implemented an early installation of an additional 256 processors in the fall of 2001 by upgrading two of the eight LSC nodes to 256 processors. This increased the total number of processors to 1408 for the HPCS, distributed as 1280 LSC processors for production computing and 128 AC processors for analysis and I/O-intensive computing. The utilization of the production LSC by user applications has grown steadily over the past year as scientists implement expanded modeling experiments and perform extensive testing of newly designed coupled climate models. As of March 2002, the production system was becoming saturated with user jobs; as a result, GFDL will implement a resource allocation system on the HPCS in June.

The new Hierarchical Storage Management System consists of three StorageTek Powderhorn silos with 41 tape transports and a capacity of roughly 18,000 cartridges, including cartridges with capacities of 20 and 60 GB (one GB or gigabyte = one billion bytes). The initial storage capacity of the system allows up to 500 TB (one TB or terabyte = one trillion bytes). The very high read/write performance of the silo system, together with the high system bandwidth (node to disk and node to storage-area-network (SAN) storage), minimizes storage/retrieval delays for the very large data files generated by long-running model experiments. As of April 1, 2002, the archive contained 360 TB with a growth rate of 25 TB per month. With this growth rate, the archive is projected to grow to at least 500 TB by the end of September 2002. With the workload shifting from development to production climate experiments, the archive growth rate is expected to increase well above the current rate of 25 TB per month.

Because the computer system vendor, SGI, was unable to deliver 700-MHz processors in time for the mid-contract system upgrade, Raytheon moved up the computing upgrade using 600 MHz MIPS processors. Node-by-node installation began in February 2002 and was completed by late April for all LSC and AC nodes. The live test demonstration is scheduled to occur in early May. In addition, because of the rapid growth of the archive, the HPCS vendor will move up the planned archive upgrade to the summer of 2002. This upgrade will add 200-GB

cartridges and four additional transports to read and write these larger cartridges. This will increase the total number of tape transports to 45. The use of these larger cartridges will eventually increase the total archive capacity to a maximum of 2500 TB.

GFDL capabilities for distributing data to outside users were enhanced significantly over the past year due to several upgrades. First, through support from NOAA's National Climate Data Center and other collaborators, GFDL installed a NOMADS (NOAA Operational Model Archive and Distribution System) server in FY 2001 to facilitate the sharing of model datasets with other climate researchers. The disk capacity of this system was upgraded in the winter of 2001-02 to a terabyte of storage capacity. As of fall 2001, GFDL Internet access consisted of a fractional T3 (9 megabits per second or 9 Mbps) to the commercial Internet and 10-Mbps connection to Princeton University's Main Campus via a microwave link. This microwave link was upgraded to 100 Mbps in December 2001, and GFDL is in the process of implementing access to Internet 2, which the university maintains at 45 mbps, via this link.

GFDL is providing an upgraded set of benchmark codes to Raytheon so that the vendor can develop a proposal for the option contract period, which begins in October 2003 and extends through September 2006. This proposal is due in the summer with a decision to be made by the end of September 2002.

GFDL is in the process of completing a major review and further upgrade of its IT and physical security, including an upgrade of the network firewall, creation of a "DMZ", and installation of a proximity card reader system for building access. Several external reviews and audits are included in this evaluation process.

Model development is a critical part of the laboratory's efforts to prepare to produce climate products during the coming years. Over the past year, GFDL has devoted substantial resources to this activity.

Total User CP Hours: The first measure, Total user CP hours per month, reflects the increase in computer performance, normalized by the performance of the legacy T90 system. The original measures were created prior to the new contract and did not account for the structure of the new contract, with a mid-contract upgrade in FY 2002 and a new system installed in FY 2004. Hence we propose to modify the measures to reflect the expected moderate increase in FY 2003, reflecting a full year of the mid-life enhancement. The FY 2004 predicted measure reflects an approximate doubling, decreased slightly to account for testing and transition effects. The FY 2005 predicted measure assumes an increase by a factor of 1.5 around the middle of the fiscal year. These numbers do not reflect additional hardware to be acquired during the coming summer, pending negotiations with the vendor once the mid-life upgrade is accepted.

The FY 2001 CP hours measure fell short of the predicted goal because of the delay in delivery of the initial system. The FY 2002 measure is projected to be 122,000 T90 CP-hours and to approximately match the projected measure.

Total Memory Per Job: Because of the design of the HPCS to multiple nodes, the largest amount of memory available per user job is 64 GB, through the end of the base contract period. Hence, the achieved measures for FY 2001 and FY2002 are 64 GB. GFDL projects the amount of memory available per job to double to 128 GB in FY 2004, depending on design of the new system.

Total Archived Data: The growth of the archive has been somewhat less than anticipated, as indicated by the measure of 210 TB in FY 2001 and the projected measure of approximately 500 TB by the end of FY 2002. Based on this growth rate, GFDL proposes to reduce the predicted growth rates in FY 2003 through FY 2006 to the values indicated in the table. However, if climate scenario production accelerates, these projections may be low.

Total Available Archive Storage: The numbers shown reflect the addition of storage capability by the vendor to track growth in archived data. The FY 2002 projection reflects the installation of larger 200-GB cartridges to accommodate this growth.

Typical Archived File Size: This metric lacks an objective basis, since model runs produce data at dramatically different rates depending on the scientific objectives of the experiment. Over the past year, however, the total archival data produced by modeling experiments has increased dramatically due to increases of computing and storage capacity. An R30 SuperSource coupled model experiment running on the T932 system in early FY 2001 typically produced a total archived data amount estimated to be roughly 200 GB for a 1000-year run. A study of eddy statistics from high-resolution isopycnal model experiments with 1/6º resolution for the southern hemisphere ocean produces 1,100 GB of from a 17-year run, saving daily history data. These are high values, with more typical sizes estimated to be 150 and 600 GB for FY 2001 and FY 2002 respectively.

GFDL is dropping this metric because it is too difficult to measure objectively. We are replacing it with the following metric, which is a measure in the Exhibit 300 for this project: "Average monthly utilization percentage of available production CP hours". This metric evaluates the utilization of system computing resources, which is likely to decrease temporarily with the installation of the new system in FY 2004.

Annual Number of Analysis Applications Parallelized: GFDL has identified three analysis applications that were parallelized in FY 2001 and two in FY 2002. However, based on the lab's experience with the new HPCS, it is becoming clear that parallelizing analysis codes is lower priority than previously believed. These codes typically are very I/O intensive rather than compute intensive, so that wall-clock time is controlled by I/O time rather than CP time. As a result, GFDL scientists have given far more attention to developing new analysis applications to run on a single AC processor rather than to parallelizing these codes. Because of this, GFDL is replacing this measure with the following new performance measure: "Number of major analysis applications created or converted to a parallel form," with a goal of 2 per year. This measure is consistent with one of the measures in the Exhibit 300 for this project.

GFDL Performance Measures *	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Total user CP hours per month (in units of 1000 T90-CPU hours) on production system	57/68	122/ 119	135/ 378	250/ 545	350/ 545	430
Total memory used per job (in gigabytes)	64/100	64/100	64/100	128/ 200	128/ 200	128

GFDL Performance Measures *	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Total archived data (in terabytes)	210/ 350	500/ 700	1000/ 1600	2000/ 2700	3300/ 3800	4500
Total available archive storage (in terabytes)	500/ 500	800 / 1000	2000	3000	4000	5500
Typical archived file size (in gigabytes) *[superseded by the following measure]*	*150/ 100*	*600/ 500*	*500*	*1000*	*1000*	
Average monthly utilization percentage of available production CP hours *[new measure]*	77/75	80/78	81	78	80	81
Annual # of analysis applications parallelized *[superseded by the following measure]*	*3/5*	*2/4*	*4*	*4*	*4*	
Major analysis applications created or converted to parallel form *[new measure]*	3/2	2/2	2	2	2	2

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

As discussed elsewhere, the initial system delivery was delayed in FY 2001 due to a worldwide shortage of key integrated circuits. Because of this delay, the installation was rescheduled for March 2001 with the live test demonstration (LTD) scheduled for March. The successful LTD occurred in March, and the successful completion of the 30-day acceptance test occurred on April 24, 2001. In order to make up for lost cycles due to the initial delivery delays, the vendor accelerated delivery of two additional nodes to the fall of 2001 and moved forward the installation of the mid-contract system enhancements to the spring of 2002. The LTD for these enhancements is projected to occur in early May of 2002.

GFDL Milestones	FY Goal	Completion/ Revised Goal
Deliver system to GFDL, install and begin testing	FY 01	FY 01
Begin system acceptance and initiate operations and transition activities	FY 01	FY 01
System fully operational	FY 01	FY 01
Legacy systems (T932 and T3E) de-commissioned	FY 01	FY 01

GFDL Milestones	FY Goal	Completion/ Revised Goal
Annual system performance review	FY 02	FY 02
Mid-life system enhancements	FY 02	FY 02
Evaluate option period proposal	FY 02	FY 02
Annual system performance review	FY 03	
Annual system performance review	FY 03	
Deliver new system to GFDL, install and begin testing	FY 04	
Begin system acceptance and initiate operations and transition activities	FY 04	
System fully operational	FY 04	
Annual system performance review	FY 05	
Mid-life system enhancements	FY 05	

Future Investments: GFDL has submitted an FY 2004 budget initiative to NOAA, entitled "Climate Change Computing Initiative (CCCI)." The initiative, which requests $5 M in FY 2004 and beyond, seeks to enhance GFDL's supercomputing capability to enable a full set of model-based climate scenarios to be run in order to document, assess, and understand the impacts of long-term climate variability and change on the U.S. This request for enhanced computing capability supports the Climate Modeling Center proposed to be created at GFDL under the President's Climate Change Research Initiative (CCRI) in FY 2003. The CCCI will enable NOAA and the nation to recoup the investments it has made and will make under CCRI to turn improved understanding and simulations of the climate system into societally useful information. The expected return on investment is expected to be very large and will be documented in a benefit/cost analysis.

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
GFDL	Development/ enhancement	13,370	15,040	13,540	13,540	13,540	13,540	13,540
	Steady state	3,470	4,810	4,620	4,620	4,620	4,620	4,620

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STRATEGIC GOAL: PROMOTE SAFE NAVIGATION

The Programmatic Goal and Objectives: In order to achieve the benefits envisioned under the "Promote Safe Navigation" strategic goal, NOAA will need to continue investing in information technology. Desired benefits include reduced marine navigation risks, enhanced environmental protections, and heightened competitiveness of the U.S. shipping industry. Investments in information technology are encompassing all of the objectives of "Promote Safe Navigation" including: to build, maintain and deliver a digital nautical charting database to underpin new electronic navigation systems and which integrate satellite positioning, tidal heights and currents, radar and sonar, and navigational aides; to update nautical surveys of the Nation's coastal areas using full-bottom coverage technologies; to define the national shoreline in an accurate and consistent manner using state-of-the-art technology to serve the Nation's navigational and coastal managers; to provide mariners with real-time observations and forecasts of water levels, tides and currents, and weather conditions in ports; and to transform the obsolete geodetic reference frame into a GPS-based system of monumented marks and continuously-operating reference stations to support the digital revolution in mapping, charting, and surveying. The primary Line Office involved in achieving this goal is NOS.

Nautical Charting and Surveying System: To support NOAA's strategic goal to "Promote Safe Navigation" NOS must (1) update nautical surveys of the coastal areas using full-bottom coverage technologies and (2) maintain and deliver the navigational charts to support commercial and recreational use of the Nation's waterways.

A major goal of the Nautical Charting and Surveying Program is to integrate the Electronic Nautical Chart and raster chart update processes.

The Nautical Charting and Surveying System meets the demand for more current nautical information, greater protection of life, property, and the environment, as well as significantly improve the efficiency of maritime commerce. System objectives are to upgrade acquisition technology; optimize hydrographic data transfer on computer systems; build, maintain and deliver a digital nautical database to underpin new electronic navigational systems; and to improve the productivity of the chart-making process for safe and efficient marine navigation.

NOS is creating a Vector Electronic Nautical Chart (ENC) in the internationally-accepted S-57 format to produce the vector electronic chart data. The vector chart can be used in conjunction with raster data in electronic navigational systems. Clearly these actions depend upon the use of information technology and the achievement of these goals will be delayed by budget limitations.

The information technology architecture being used to support NOAA's nautical charting and surveying program is desk-top computer systems and commercial off-the-shelf software, with relatively low-risk internal software development.

System Status and Plans - The Nautical Chart production system is made up of two unique systems and two sets of unique applications that rely on loosely coupled support systems for the management of extensive source libraries and process management data bases. The primary components of the two systems are commercial-off-the-shelf packages that are customized and/or supplemented with automated processes to meet the charting requirements for raster/paper charts and ENCs.

A major goal is to integrate the ENC and raster chart update processes. The raster production system utilizes several flat file data bases that need to be integrated into a database that will support spatial data and attribution requirements for both ENC and raster chart products. The next step will be to document requirements, design, develop, and implement enhancements that will improve the production system in a phased approach.

Another long-range goal is to store its charting information in a single, comprehensive database to store chart, source metadata and critical feature information.

The Office of Coast Survey has a continuous improvement process in place to further modernize and automate the existing charting process, to improve the quality and timeliness of the charts and to provide new products in order to better serve the needs of the mariner.

Nautical Charting and Surveying System Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Number of Electronic Nautical Charts (new per year/maintained in continual maintenance and field verified)	70/70	90	90	90	90	90
% of digital database built and in continual maintenance for raster charts	100/ 100	100	100	100	100	100
% of Raster Charts updated on a weekly basis (CD format)	100/ 100	100	100	100	100	100
% of backlog of critical area surveys completed (cumulative)	26/26	30	33	36	39	42

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

Nautical Charting and Surveying System Milestones	FY Goal	Completion/ Revised Goal
Consolidated Raster/ENC source database phase 1 - Data migrated to new object oriented database, maintained in both locations	FY 04	
Consolidated Raster/ENC source database phase 2 - Standard products extracted from object oriented database	FY 05	
Consolidated Raster/ENC source database phase 3 - Value Added Product providers extract data for new products	FY 06	

Real-Time Observations and Forecasts of Water Levels, Tides, and Currents:

A Physical Oceanographic Real-Time System (PORTS®) provides real-time environmental observations and forecasts for a specific U.S. port as needed by the marine transportation community and other users requiring operational oceanographic information. Each PORTS® is designed to meet local user requirements.

A PORTS® provides real-time oceanographic data for port operators and mariners. Additional PORTS® will be implemented and the overall system upgraded with a centralized voice system.

PORTS® plays an important role in NOAA's strategic goals to promote safe navigation and sustain healthy coasts. It is a decision- support tool that provides real-time environmental information for a given U.S. port needed to establish navigation parameters for safe travel within the port; to determine appropriate cargo transport load information; and to define both present and future oceanographic conditions at the given location.

The benefits derived from PORTS® include a reduction in maritime transportation risks; mitigation of damages should an accident occur; increased cargoes able to move safely and efficiently into and out of the Nation's ports and harbors; and support to coastal planners and researchers in order that safe and efficient development of our coastal and ocean resources can be achieved.

PORTS® systems come in a variety of sizes and configurations. The largest existing installations comprise over 26 separate instruments. The smallest consist of a single water-level gauge and associated meteorological instruments, and are referred to as "PORTS Lite". Each PORTS® system acquires oceanographic instrument data and disseminates observations through digital and voice modes. Each system has a PC for data acquisition, a PC for a voice host, and a PC to serve as a gateway to the Internet. Each PORTS® is monitored through the Continuous Operational Real-Time Monitoring System (CORMS). The CORMS provides 7-day-a-week, 24-hour-a-day monitoring and quality control of instruments and data in order to ensure the availability, accuracy, and quality of the real-time environmental observations. The

CORMS combines the use of real-time communications, data analysis, system monitoring, and electronic reporting and notifications techniques to perform its tasks.

System Status - In FY 2001 CO-OPS developed the business approach to remove the requirement that the user needs to know where the data and information are located. Metadata is the key to open systems and standard adherence to provide interfaces independent of accessing system dependancies. Metadata is included in the planning process during development and is prepared with the data during collection.

Future upgrades and enhancements include:

Centralized Voice System : The new interactive voice response (IVR) system will be implemented by the Center for Operational Oceanographic Products and Services (CO-OPS) at the CO-OPS headquarters in Silver Spring, Maryland. This centralized single hardware platform will store and execute all of the existing and future PORTS® voice applications.

PORTS® Performance Measures*	FY 01	FY 02	FY 03	FY04	FY 05	FY 06
Total PORTS & PORTS Lites implemented	7/15	10/17	13/19	15/19	19/21	21/23
% of PORTS data quality controlled	100/ 100	100	100	100	100	100

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

PORTS® Milestones	FY Goal	Completion/ Revised Goal
Implement National PORTS Database Metadata Interface	FY 01	FY 01
Implement CORMS II	FY 01	FY 03
Implement PORTS Analysis Database	FY 02	FY 03
Implement CMM Organizational Policies for PORTS	FY 02	FY 03
Implement Centralized Voice System	FY 03	
Implement PORTS Analysis Capabilities	FY 03	FY 04
Implement CMM Software Processes for PORTS	FY 03	FY 04
Implement Data Archive Strategy for PORTS	FY 04	FY 03

PORTS® Milestones	FY Goal	Completion/ Revised Goal
Implement Accessibility to the PORTS Data Archive	FY 05	FY 03

The National Water Level Observation Network Data Management System:

The National Water Level Observation Network (NWLON) provides the foundation for the tidal and Great Lakes vertical water-datum control for the nation. A key IT support system for NWLON is the NWLON Data Management System (DMS), which processes data acquired from NWLON sites, performs quality-control functions, and makes the data available to users.

The NWLON Data Management System processes and quality-controls tide and water-level data, and makes it available to users. The system is now operational.

The NWLON DMS plays an important role in NOAA's strategic goals to promote safe navigation and sustain healthy coasts. It provides tide and water-level information needed to establish and maintain the vertical water level reference required to support nautical chart production; to determine state and federal boundaries; and to define setbacks from high water lines.

The benefits derived from this system include a reduction in maritime transportation risks, which thereby heightens the competitiveness of the U.S. shipping industry and supports coastal zone planners and researchers in order that safe and efficient development of our coastal and ocean resources can be achieved.

NWLON DMS uses a client-server architecture that relies upon RISC-based workstations as the servers and PCs as the clients. It consists of a data acquisition platform which is a Silicon Graphics workstation which continuously receives data via the Internet from NOAA's Command and Data Acquisition ground station at Wallops Island, Virginia, through the National Weather Service Gateway. The workstation then decodes the data and checks the quality. The initial data checks provide preliminary quality assurance. The data is then loaded into a database from which data processing is done before making the data available to users. Much of the NWLON DMS software was developed for its specialized functions of quality control, quality assurance, and for its specific applications.

System Plans - In FY 2001 real-time quality control systems like the Continuous Operational Real-Tie System (CORMS) was enhanced and further developed using state of the art rule-based technology. A real-time means to remove the possibility of any erroneous data from public dissemination was developed and implemented.

To keep up with ever increasing speed and capacity requirements, data processing platforms that can be upgraded cost- effectively were purchased. To maintain customers, enable new product

development, and to continually reach out to the Internet world, an efficient, accessible Web site was implemented and maintained.

Future upgrades and enhancements include:

- Upgrade all database operational, developmental and test servers. This may involve moving to another platform and will certainly include memory and processor upgrades. The current system is over 6 years old and as a result of increased ingestion of data and more demand for CO-OPS products, the system has reached its life cycle.

NWLON DMS Performance Measure*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
% increase in processing rate of monthly water level station data through NWLON DMS	35/35	45	45	45	45	45

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NWLON DMS Milestones	FY Goal	Completion/ Revised Goal
Complete modernization of preliminary quality control of data	FY 01	FY 01
Implement additional automated data processing capabilities	FY 01	FY 01
Implement CMM Organizational Policies for NWLON DMS	FY 02	FY 03
Implement data entry capability via remote sites	FY 02	FY 03
Complete system upgrade of database servers	FY 03	
Implement CMM Software Processes for NWLON DMS	FY 03	FY 04
Implement Web-based NWLON DMS client interface	FY 03	FY 04
Implement Data Archive Strategy for NWLON DMS	FY 04	FY 03
Implement Accessibility to the NWLON DMS Data Archive	FY 05	FY 03

Geodetic Support System: The Geodetic Support System performs functions necessary for NOAA to attain its objective to "Develop the National Spatial Reference System (NSRS)", which is part of NOAA's strategic goal to "Promote Safe Navigation". The NSRS provides a common geographic framework and is the foundation for the National Spatial Data Infrastructure (NSDI), which is a critical component of the "information superhighway" and is essential for mapping, charting, navigation, boundary determination, property delineation, resource evaluation surveys, and scientific applications. NSDI facilitates data sharing by organizing and providing a structure of relationships between producers and users of spatial data and thus ensures consistent and reliable means to share spatial data. The System acquires data from Global Positioning System (GPS) Continuously Operating Reference Stations (CORS) and other sources, runs GPS and geoid reduction software, and performs other functions that require high computational speeds. The GPS satellite tracking data is processed to determine satellite orbits and to establish, maintain, and monitor a national GPS network. The National Geodetic Survey (NGS) collects and distributes GPS observational data from a nationwide network of permanently operating GPS receivers. The Federal Base Network (FBN), the foundation of the NSRS, comprises both horizontal and vertical positions of monumented stations. The NSRS is complemented by a geoid model, enabling users to determine elevations accurately and efficiently. All data is managed by the NGS Integrated Data Base (NGSIDB) System, which is the source of all products supplied to the user community.

The Geodetic Support System processes data for the National Spatial Reference System and geoid models. Plans are to expand to 1,000 Continuously Operating Reference Stations (CORS).

The primary objective of CORS is to provide local users with ties to NSRS for post-processing position determination. NSRS provides a consistent national coordinate system that defines latitude, longitude, height, scale, gravity, and orientation throughout the United States, and how these values change with time. As the basis for mapping, charting, navigation, boundary determination, property delineation, infrastructure development, resource evaluation surveys, and scientific applications, NSRS plays a critical role in ensuring the Nation's public safety, economic prosperity, and environmental well being. The system provides geodetic data to a variety of users, including surveyors, universities, state highway departments and large engineering firms. Observational data is made available to the user community within 24 hours. CORS consists observation stations and a central data facility, make available over the Internet. The observational data comes from a network of about 200 GPS receivers.

The Geodetic Support System is based on an architecture of scientific workstations used as servers and PCs used for analysis and other functions. The system provides its products to the general public through FTP services, the Internet, and by CD-ROM.

System Status and Plans - NGS plans to deploy an additional 20 data collectors per year toward the ultimate goal of 1000 CORS stations. These new stations will augment the ongoing effort to

improve observations for determination of velocities in response to shoreline and other geospatial needs such as geoid and crustal motion models.

Re-observation of the Federal Base Network vertical readjustment continues and should be complete by the end of FY 2003. Support to the National Water Level Observational Network in supplying vertical positions should be completed by FY 2004.

The National State Advisors network continues to grow with about two additional advisors joining each year.

In addition, the compilation of a National Shoreline database, a digital elevation model, GPS orbit calculation, and other modernization efforts will put a strain on the existing older hardware, therefore two UNIX servers will be replaced to support the Integrated Geodetic Data Base.

Geodetic Support Performance Measures	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
CORS stations operational (goal 1000)	210/ 210	240	270	290/ 300	315	340
Accuracy of gravimetric geoid model (cm)	6.5/6.5	6.0	5.5	5.0	4.5	4.0
% of FBN completed (horizontal)	100/ 100	100	100	100	100	100
% of FBN complete (vertical)	87/87	95	100	100	100	100
% of NWLON complete (vertical)	n/a	33	67	100	100	100
% of State Advisors	62/62	66	70	72/74	74	76

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years. The second number represents the measure presented in the FY 01 Strategic Information Technology Plan.

Geodetic Support System Milestones	FY Goal	Completion/ Revised Goal
Expand CORS to 200 stations	FY 01	FY 01
Add two State Advisor positions	FY 01	FY 01
Survey 63 NWLON Stations	FY 02	
Survey 146 FBN Stations	FY 02	

Geodetic Support System Milestones	FY Goal	Completion/ Revised Goal
GEOID '02 (New Geoid Model)	FY 02	
Add two State Advisor positions	FY 02	
FBN Total Vertical Stations 911	FY 03	
Survey 63 NWLON Stations	FY 03	
Survey 146 FBN Stations	FY 03	
Add two State Advisor positions	FY 03	
Expand CORS to 290 Stations (milestone reduced from 300 stations)	FY 04	
Survey 63 NWLON Stations	FY 04	
Survey 146 FBN Stations	FY 04	
Add two State Advisor positions	FY 04	
Expand CORS to 400	FY 07	
Expand CORS to 500	FY 10	

Search and Rescue Satellite-Aided Tracking (SARSAT): The SARSAT program and system of the United States are managed by the Direct Services Division of the Office of Satellite Data Processing and Distribution. The SARSAT program and system is part of the international Cospas-Sarsat program and system. NOAA is the lead U.S. agency for the Cospas-Sarsat program.

SARSAT is implementing a Web registration process for emergency beacons, and plans to upgrade the communications system to frame relay technology.

The mission of the SARSAT system is to provide distress alert and location information for search and rescue authorities to effect search and rescue for those in distress. For each of the past several years, SARSAT has resulted in the saving of hundreds of lives. For example, in calendar year 1999 SARSAT played a part in the rescue of 291 people in the United States; 221 people were rescued in calendar year 2000; and 169 people were rescued in 2001. Since the beginning of the international program in 1982, the saving of more than 13,000 people in distress has been attributed to Cospas-Sarsat and nearly half have been saved in the United States.

In this program, instruments flown on NOAA and Russian satellites receive signals from ships and aircraft in distress. The signals are processed in the ground system to identify the

geographical location of the distress. The SARSAT ground system of the United States is comprised of the United States Mission Control Center (USMCC) located in Suitland, MD and fourteen satellite ground stations called Local User Terminals (LUTs). Two LUTs are located in Alaska, California, Guam, Hawaii, Maryland, Puerto Rico, and Texas.

The LUTs receive, process, and distribute emergency distress data from federally-mandated maritime Emergency Position Indicating Radio Beacons (EPIRBs), aeronautical Emergency Locator Transmitters (ELTs), and experimental Personal Locator Beacons (PLBs). The distress data is down-linked by NOAA TIROS and GOES, and Russian Nadezhda satellites to the LUTs. The LUTs in turn forward the data to the USMCC. The USMCC performs the automated processing functions of matching, merging, and geographically sorting distress alerts received from both the NOAA LUTs and international Cospas-Sarsat Mission Control Centers. The USMCC disseminates distress alerts to the U.S. Coast Guard, the U.S. Air Force, and international Cospas-Sarsat partners via a packet network.

An important component of the USMCC is the 406 Registration Data Base (RDB). It is a federal requirement to register with NOAA any 406 MHz emergency beacon that is used in the U.S. The 406 RDB is the depository of the registration information and currently contains the information for more than 81,000 beacons. Information is extracted from the 406 RDB for a particular beacon after the satellite detection of that beacon. The registration information is appended to the alert data message that is sent to the search and rescue authorities of the U.S. Coast Guard and U.S. Air Force.

The USMCC relies on IT to perform its mission. The USMCC is comprised of PCs, LANs, data bases, non- proprietary applications software, COTS software, and interfaces to the packet networks for data communications. The USMCC is operated and maintained by contractor staff 24 hours per day, 7 days per week. The next generation LUTs, procured in the last quarter of FY 2001, contain minimal IT components. Each next generation LUT contains a PENTIUM-based PC and COTS software to perform satellite tracking, location processing, and communication functions.

The SARSAT program supports the NOAA strategic goal to Promote Safe Navigation by operating and maintaining the mission control center plus satellite ground stations for effecting search and rescue activities on a world-wide basis.

System Status and Plans - Award of the next-generation LUT contract took place in the last quarter of FY 2001. Over FY 2002 and into FY 2003, the existing SARSAT LUTs will be replaced and the next generation LUTs formally commissioned within the Cospas-Sarsat system. In addition, SARSAT will be augmented with the new capability of detecting distress alerts relayed through the NOAA GOES satellites.

SARSAT is currently modernizing NOAA's paper-based emergency beacon registration process by implementing a Web-based registration capability. SARSAT is registering about 18,000 new emergency beacons per year, all in paper. In addition, there are currently over 81,000

registrations total, each requiring an update every two years. The web-based registration effort will allow beacon owners to both register new beacons and update existing beacon records online.

In an effort to mitigate homeland security issues and insure back-up of NOAA's critical systems, SARSAT has deployed a fully functional back-up USMCC. This local back-up capability is augmented by formal back-up agreements with the Cospas-Sarsat partners of Canada and Australia.

IT plans for FY 2003 and beyond include the complete conversion of primary SARSAT communications from legacy X.25 networks to frame relay. In addition, SARSAT is in the process of prototyping an optical character recognition system for updating paper-based emergency beacon registrations. SARSAT is looking towards automating the registration, renewal, and update process to minimize resource costs.

Performance Measures: To perform its mission, the SARSAT ground system must be reliable, available, accurate, and timely. The system adheres to the metric of providing 90% of distress alert and location information to search and rescue authorities within 60 minutes of a distress signal being detected by a satellite. In addition, the USMCC must be effective in its handling of information from its ground stations.

Quality, or accuracy of distress alert and location information delivered to search and rescue authorities is also a key performance measure. One of the primary goals of Cospas-Sarsat is to "take the search out of search and rescue." This is accomplished by ensuring that 90% of 406 MHz beacon transmissions are accurately identified and located within 5 kilometers of their true position.

On a daily basis, a schedule is sent to each LUT indicating which satellite orbits are to be tracked for the acquisition of Cospas-Sarsat data. The performance of each LUT is measured by the percentage of orbits actually acquired of orbits scheduled. On a monthly basis and yearly basis, 98% per LUT is expected. This availability, coupled with the entire ground segment, which includes the USMCC and commercial communications circuits, is 97%.

The performance of the 406 RDB will be measured by the usefulness of the information in the data base. For each United States beacon which is activated and which is registered in the 406 RDB, the search and rescue personnel will indicate in feedback reports whether or not the registration information was useful. The ultimate expected yearly percentage of useful registrations of activated and registered beacons will be 75%.

SARSAT Performance Measures*	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
Timeliness - Maintain 90% transmission rate of SARSAT distress alert and location information to search and rescue authorities, within 1 hour - new	92.9/ 90	90%	90%	90%	90%	90%
Accuracy - Locate 90% of 406 MHz beacon transmissions within 5 kilometers - new	90.25/ 90	90%	90%	90%	90%	90%
Availability - Maintain [97%] aggregate availability for the SARSAT ground segment - new	n/a	97%	97%	97%	97%	97%
Reliability - 65% of alerts contain registration data useful to search and rescue case - new	n/a	65%	65%	65%	65%	65%

* When two numbers are presented and divided by a "/", the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

SARSAT Milestones	FY Goal	Completion/ Revised Goal
Replace SARSAT X.25 domestic Packet Switching Data Network Milestone: Obtain required approvals, and complete orders for domestic Frame Relay circuits.	FY 02	FY 02
Improve SARSAT alert data distribution Milestone: Begin distributing SARSAT alerts directly to Central and South American countries instead of the Joint Search and Rescue Center operated by the Southern Command	FY 02	FY 02
Secure SARSAT systems from unauthorized access Milestone: Complete installation of a firewall for the USMCC	FY 02	FY 02

SARSAT Milestones	FY Goal	Completion/ Revised Goal
Meet all the requirements of the Government Paperwork Elimination Act Milestone: Develop and implement an electronic web-based registration capability for emergency beacon users	FY 02	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in Florida	FY 02	
Replace SARSAT X.25 domestic Packet Switching Data Network Milestone: Complete installation of new Frame Relay circuits at Florida LUT site	FY 02	
Replace SARSAT X.25 domestic Packet Switching Data Network Milestone: Complete installation of new Frame Relay circuits at Alaska LUT site	FY 02	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in Alaska	FY 02	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in California	FY 03	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in Hawaii	FY 03	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in Guam	FY 03	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in Maryland	FY 03	
Replace SARSAT ground stations Milestone: Perform site survey, installation, testing and commissioning of local user terminals in NASA SEDL	FY 03	

SARSAT Milestones	FY Goal	Completion/ Revised Goal
USMCC Milestone: Life cycle replacement of USMCC processors	FY 04	
Replace SARSAT ground stations Milestone: Perform development, testing and commissioning of deployable local user terminal	FY 04	
Develop and implement an electronic optical character recognition scanner of emergency beacon registrations	FY 05	

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
Nautical Charting and Hydrographic Surveying	Development/ enhancement	1,812	2,050	2,318	2,618	2,951	3,325	3,748
	Steady state	703	785	873	980	1,076	1,184	1,301
Real-Time Observations and Forecasts	Development/ enhancement	773	1,181	1,161	1,161	1,161	1,161	1,161
	Steady state	340	560	652	750	862	992	1,140
NWLON DMS	Development/ enhancement	408	596	553	553	553	553	553
	Steady state	329	436	480	528	581	639	703
Geodetic Support System	Development/ enhancement	124	130	136	152	150	157	165
	Steady state	531	558	584	615	645	677	711

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
SARSAT	Development/ enhancement	2,843	1,361	1,711	1,400	1,400	1,400	1,400
	Steady state	1,819	1,869	2,093	2,200	2,200	2,350	2,350

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STRATEGIC GOALS: BUILD SUSTAINABLE FISHERIES AND RECOVER PROTECTED SPECIES

The Programmatic Goals and Objectives: NOAA's "Build Sustainable Fisheries" strategic goal seeks to increase the Nation's wealth and quality of life by ensuring sustainable fisheries that can provide safe seafood, a healthy fishing industry, and recreational opportunities. Objectives for helping to meet these goals are: assessing the status of fishery resources, advancing fishery predictions, managing for economic growth, ensuring adequate compliance, and providing research and services for fishery-dependent industries. The primary Line/Program Offices involved in this goal are NMFS, OAR, and the Coastal Ocean Program Office.

Through the "Recover Protected Species" strategic goal, NOAA will conserve marine species and recover those in danger of extinction. By 2004, NOAA will be on the road to recovering marine species at risk and maintaining the healthy coastal ecosystems upon which they depend. To accomplish this goal, NOAA's objectives are to conserve species by implementing recovery and conservation plans and to monitor, assess, and predict the status of protected species and their ecosystems. The budget estimates shown may undergo significant revision as a result of the business process re-engineering taking place in NMFS.

Since the same IT systems support both of these goals, as well as the NMFS portion of the Sustain Healthy Coasts goal, they will be dealt with together.

National Marine Fisheries Service (NMFS)/NOAA Fisheries: Information Technology (IT) capabilities provide the key tools for NOAA Fisheries to accomplish its mission, *"Stewardship of living marine resources for the benefit of the nation through their science-based conservation and management and protection of the health of their environment."* IT is interwoven through all aspects of NOAA Fisheries' business processes which strive to advance the vision that, *"The American people are able to enjoy the wealth and benefits of diverse and self-sustaining living marine resources."* To implement its mission and vision, NOAA Fisheries' business processes support the following three NOAA Strategic Planning Goals: *"Build Sustainable Fisheries," "Recover Protected Species" and "Sustain Healthy Coasts."*

The NMFS System supports the management and protection of living marine resources. NMFS is implementing a Fisheries IT architecture which will provide a framework for integrating new acquisitions with existing capabilities.

The *NOAA Fisheries Strategic Plan* includes *"Improving our information systems"* as one of its foundation performance elements in recognition of the importance of IT within NOAA Fisheries.

NOAA Fisheries established the position of Chief Information Officer (CIO) and the Office of the CIO in response to the Secretary's IT Restructuring Plan. The CIO provides a central focal point for the agency's IT programs and is responsible for developing and recommending policies for managing IT within the agency, consistent with Departmental policies and guidelines. In accordance with that plan, the CIO reports directly to the NOAA Fisheries Deputy Assistant Administrator. The CIO is also chairman of the National Information Management Board (NIMB). The NIMB serves as the agency's IT Review Board. The CIO in cooperation with the NIMB has developed the Fisheries IT Architecture in order to effectively manage IT within its nationally dispersed organizational structure.

Meeting major strategic challenges for the future will involve the continuing evolution of our IT Architecture in concert with enhancing our IT management framework. Continuing to place our business drivers at the forefront of our IT planning process is paramount to integrate budget the formulation process with our IT strategic planning. Improvements in IT management processes is the key for developing useful performance measures that will serve as realistic metrics for evaluating how well IT enables key business strategies.

Our vision is to continue to build and enhance our infrastructure which is the cornerstone of our IT environment. This foundation allows us to continue to enhance our database environment by building applications that add value to the overall operations of the Agency.

Additional challenges we face will be to ensure that our critical data and infrastructure remains secure. We must continue to educate and train our staff on the benefits, risks, and costs of IT security, while continuing to move forward in developing E-government applications that provide our constituents with timely information and services that they require.

System Status and Plans -

Web-based Fisheries Grants Management Data Base: This System has been in production for over three years and currently serves as the prototype for the NOAA Grants on-line initiative. It provides NOAA Fisheries with the ability to electronically manage grant proposals, interfacing with both the Fisheries Financial Reporting System, and the NOAA Grants Management Division database.

Corporate Web presence: NOAA Fisheries has successfully tested and deployed the new NOAA Fisheries Internet portal. The portal design template and design library elements are conveniently located on the NMFS WebGuide for use by web developers throughout the Agency. The new design incorporates innovative features such as Feature Items, a Kids Corner and interactive Flash technology. The improved usability of NMFS's Internet web site will increase distribution of information to the public and improve the agency's public image.

Information Assurance Accreditation of IT Systems: The Agency has met OMB A-130 requirements by obtaining assurance accreditation of 25 out of a total of 30 NOAA Fisheries IT systems. In addition, NOAA Fisheries completed 30 self-assessment questionnaires to identify corrective actions for compliance of the Government Information Security Reform Act (GISRA). To date, NOAA Fisheries has completed five of the eight identified corrective actions and is on target for completing the remaining corrective actions this fiscal year.

Agency-wide Capital Planning and Investment Control Process: NOAA Fisheries IT planning and investment process is continuing to evolve during the current fiscal year. NOAA Fisheries, through both the NIMB and Regional IT Coordinator (RITC) committees has identified long-term objectives and is designing a method for prioritizing these objectives. The NIMB, serving as a control board, will evaluate key projects linked to our highest priority objectives and develop a spending plan for future IT investments.

Intranet Access to All Remote Locations: Virtual Private Networking (VPN) will be used to connect all NOAA Fisheries remote users to the Fisheries' Intranet. VPN deployment will be completed in FY 2003.

Public Consultation Tracking System: NOAA Fisheries is continuing to enhance its Public Consultation Tracking System (PCTS). The application began as an effort to provide our constituents with an electronic means to review the status of Section 7 permit consultations in process between NOAA Fisheries and the Corps of Engineers. This system was piloted in the Fisheries Northwest Region, and had a major impact in improving outreach efforts to constituents.

The pilot has been such a success that it is currently being expanded to include consultations with a variety of external agencies such as the US Forest Service, Bureau of Land Management, and the Federal Highway Administration. This system will be expanded to other NOAA Fisheries Regions after implementation is completed in the Northwest Region. Implementation of this E-government initiative will significantly improve our ability to provide up to date information to businesses, and to citizen and constituent groups regarding government to government consultation processes.

Electronic Rulemaking/Records Administration: In response to the President's e-Government initiative for online rulemaking, NOAA Fisheries is deploying e-Comments as an initial step to implementing full electronic rulemaking. E-Comments will provide a Web site for the public to submit comments on proposed rules and other Federal Register notices electronically. An initial pilot for the system accepted comments on one proposed rule at Headquarters in FY 2002. NOAA Fisheries will expand the pilot to additional Financial Management Centers in FY2003. Our ultimate vision is to establish an electronic records administration system (i.e. an electronic docket), electronic dialogues with the public, and internal and external rulemaking portals. The e-Docket records administration system will establish a set of IT tools to store and retrieve text documents, optically scan and convert images convert hard copy documents to electronic form, and submit documents over the Web. Using these tools will enable NOAA Fisheries to reduce

the number of FOIA requests, to meet time constraints for rule publication, increase the public's involvement in the rulemaking process, and ultimately make better rules more resistant to successful legal challenges. NOAA Fisheries is working closely with the Department of Transportation, the managing partner for the President's online rulemaking initiative, to reuse as much available technology as possible and to avoid building redundant systems.

One-Stop Electronic Permits: The purpose of this project is to provide an opportunity for both the commercial and recreational fishing industry to use a Web-based customer-service platform, where fishermen can obtain information and perform routine permitting transactions on their own. NOAA Fisheries will conduct a requirements-gathering effort with the Northeast Regional Office to identify key permitting activities used for authorizing Commercial Seafood Dealers in the Northeast and Southeast Regions. Based on the requirements, NOAA Fisheries will develop a permits application and use it as a basis for a common One-Stop permits environment in the Northeast Region. The application would be accessed through a portal linked to the NOAA Fisheries home page. An assessment of the adequacy of this application will be conducted and the technology will be made available to other Regions for the development of permitting applications, all of which would eventually be accessible via the NOAA Fisheries home page.

Groundfish Permits: NOAA Fisheries has developed and implemented an electronic permit renewal and payment system for the Northwest Pacific Coast Groundfish Limited Entry Program. This system went on-line September 1st 2001 to coincide with the annual Pacific Coast Groundfish permit renewal season. This application allows individuals and businesses to pay groundfish permit fees with a credit card using a NOAA Fisheries Web site. NOAA Fisheries worked with the Department of the Treasury Financial Management Service and the Bank of America to develop and implement the system. In an effort to promote federal e-payment systems, Treasury has provided an "off the shelf" product free of charge, and is assuming liability for credit card security. Permit holder information is gathered at the NOAA Fisheries Web site, and the encrypted transaction is passed to a Treasury Web site to process credit card information. The successful implementation of the Groundfish Permit Renewal E-Payment System has served as "proof of concept" for other e-pay sites at NOAA Fisheries

Marine Mammal Stranding: The Marine Mammal Health and Stranding Response Program (MMHSRP) was established under Title IV of the Marine Mammal Protection Act. NOAA Fisheries has collected basic data on marine mammal strandings from authorized respondents during the past twenty years. Stranding data provides valuable descriptive information essential for NOAA Fisheries conservation and management decisions. Additionally, as protected resource issues become increasingly important in the context of fishery management, it is necessary that this information be standardized and available in electronic format. NOAA Fisheries is often asked by constituents and members of Congress for nationwide stranding statistics and trends. The MMHSRP database will standardize data collection and management by establishing a national marine mammal database that includes the content of existing regional databases, and brings them together in a common compatible format, utilizing a single, centrally located database. This will allow NOAA Fisheries to better archive stranding data as well as to compare data between the regions, and efficiently query and analyze stranding data.

FRS: The Financial Reporting System (FRS) is used to track the agency's financial status. FRS provides an automated system for collecting, storing, and retrieving information concerning the financial activities of the Financial Management Centers (FMCs) of NOAA Fisheries. Financial information enters FRS through various sources, where it is processed and stored. Management and administrative personnel then retrieve this information in the form of reports for analysis and reconciliation. This system has been in place since 1996 and has evolved into a mature web based application with extensive capability to serve the needs of the NOAA Fisheries financial and management community. Currently, NOAA Fisheries is in the process of preparing FRS for the NOAA migration from FIMA to CAMS, and must reconcile with CAMS when it becomes the system of record in October 2002. The CAMS staff recognizes that CAMS will not provide much of the functionality currently available with various NOAA Line Office "cuff" systems, including FRS, and is developing interfaces. NOAA Fisheries is on target to be "CAMS ready" this October, and has already interfaced the CAMS Travel Manager and CPCS (Commerce Purchase Card System) with FRS.

Intranet Deployment: NOAA Fisheries will deploy the first phase of a new Intranet site this fiscal year. NOAA Fisheries staff are deployed nation-wide throughout our Regions, Science Centers and labs. In many cases staff are co-located with other Federal agencies or in small office environments. The ability of these staff to keep abreast of agency news; provide new employee orientation; provide updates on employment and training opportunities; and disseminate policy issues is greatly limited by geographic isolation. The deployment of a corporate Intranet will serve as a clearing house and communications tool for a wide array of information dissemination. The Website can help to integrate regional, and small work group staff into the larger NOAA Fisheries environment.

The first phase of the deployment has totally revamped an aging design and will provide a wealth of information including: Training Programs: the EEOAC program; IT support information; calendar of events; employee orientation; constituent affairs; and agency policies. Later phases will include links to Regional Intranets and expansion of programmatic information pages.

Electronic Grants: The Fisheries Electronic Grants System has been in production for over three years. It provides the Fisheries Federal Program Officers (FPOs) with the ability to electronically manage grant proposals in the pre-award phase, including conducting competitions, interfacing with NOAA Fisheries Financial Reporting System, and interfacing with the NOAA Grants Management Division database.

Fisheries Electronic Grants includes a well-received electronic review process which has allowed over 500 reviewers to conduct peer reviews of proposals online. The review process is limited in scope and will be expanded to allow for non-scored reviews, qualitative scoring for competitive proposals, and review questions with sub-questions. Additional upgrades to the Fisheries Electronic Grants system will include electronic passing of data to the Grants Management Division to eliminate manual re-entry of data.

Training: NOAA Fisheries e-learning program was established to address the IT training needs of a very diverse organization. Offering on-line training is one of the vehicles available to NOAA Fisheries employees interested in expanding skills in desktop applications, system administration and business development. NOAA Fisheries has broadened its e-learning capability to incorporate on-line mentoring, and advanced systems security training. Archived seminars and customized student profiles were added to enhance student's learning experiences. On-site instructional seminars are held to supplement NOAA Fisheries on-line training program. NOAA Fisheries will participate in the NOAA e-learning test pilot this fiscal year.

Connectivity to all NOAA Fisheries employees: NOAA Fisheries will ensure that all employees, including field staff and remote users, have access to NOAA Fisheries Intranet and other NOAA IT resources currently identified as " access restricted". The instrument for access will be Virtual Private Networking (VPN), the design of which will follow the NOAA Fisheries Wide-Area-Network, providing termination at one of two hubs where common services used by remote users can be accessed.

Testing and piloting of the VPN solution began this fiscal year, with operational testing currently scheduled for the third quarter. Procurement and deployment are scheduled for completion in FY 2003 upon successful completion of the operational test.

Video Conferencing: NOAA Fisheries utilizes video teleconferencing to connect its remote regions and centers throughout the United States. The NOAA Fisheries Assistant Administrator conducts a weekly video call in which he communicates with Regional Administrators and Science Directors. NOAA Fisheries has expanded its video conferencing capability to include additional laboratories. Video teleconferencing meetings have been held to discuss NOAA Fisheries international issues and training for major applications.

NOAA Fisheries is upgrading its current video teleconferencing equipment. This new technology will allow more flexibility with scheduling of conferences, enhanced graphics and secured teleconferencing. As NOAA Fisheries replaces existing systems it will expand its ability to communicate with constituents by providing the existing equipment to the Fisheries Management Councils. NOAA Fisheries plans on completing both phases (upgrading and expansion) in FY 2002.

Security (GISRA, etc.): NOAA Fisheries IT Security Program continues to move in a positive direction. Vulnerabilities have been identified and responded to successfully. The Agency has met OMB A-130 requirements by obtaining assurance accreditation of 25 out of a total of 30 NOAA Fisheries IT systems. In addition, NOAA Fisheries completed 30 self-assessment questionnaires to identify corrective actions for compliance of the Government Information Security Reform Act. To date, NOAA Fisheries has completed five of the eight identified corrective actions and is on target for completing the remaining corrective actions this fiscal year. Intrusion detection software is scheduled for installation on all NOAA Fisheries public Web servers this fiscal year.

NOAA Fisheries management has identified IT security as one of its top IT priorities. Security policies are currently under development and the recruitment of a full-time IT security officer is presently in progress. IT security training for all NOAA Fisheries system administrators remains a high priority.

NOAA Fisheries is participating in NOAA's Homeland Security effort. Critical functions within the agency have been identified and initial steps to fail over the infrastructure to support those functions is currently underway.

IT Administration: The NMFS CIO, members of the NIMB, the RITCs, and the OITCs work together to ensure that the IT requirements are adequately addressed for all programmatic functions and activities. Regional and Headquarters IT staff participate in programmatic planning activities by identifying IT requirements.

The CIO manages the agency's IT investment portfolio by reviewing and approving IT spending plans for each of the regional and HQ offices, which are submitted annually by the RITCS and OITCs. To galvanize the link between business processes and IT, IT strategic planning and operational planning activities are integrated with the agency's strategic and operational planning.

NOAA Fisheries IT Performance Measures *	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06
No. of PRA activities with Web-based options	10%/ 10%	25%	90%	95%	96%	98%

* When two numbers are presented and divided by a "/," the first number represents the achieved FY 01 performance measurement or the revised measure for future years.

NOAA Fisheries IT Milestones	FY Goal	Completion/ Revised Goal
Corporate Web presence established	FY 01	Complete
Information Assurance Accreditation of 30 IT Systems	FY 01	FY 02
Agency-wide capital planning and investment control process established	FY 02	
Internet access provided to all remote locations	FY 03	
GPEA requirements fulfilled	FY 03	
e-Comments expanded to FMCs	FY 03	

NOAA Fisheries IT Milestones	FY Goal	Completion/ Revised Goal
Refreshment of technologies to keep pace with industry advances	ongoing	

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
NMFS Systems	Development/ enhancement	8,420	10,750	13,210	21,000	18,970	19,860	21,660
	Steady state	16,800	17,680	18,610	19,540	20,520	21,550	22,620

Future Investments: Consideration is being given to the following as possible IT budget initiatives for the FY 2004 budget:

Fishery Information System - Improvements need to be made in the amount and quality of fisheries statistics that are available to managers, including improved efficiency in the collection, access to and dissemination of the data. The approach will be to fund increased fisheries statistics data collections by states and NOAA Fisheries to improve the quality and quantity of science data available to support living marine resource policy decisions.

This initiative will support regional Fisheries Information Networks (FIN) by providing additional funds to support the interstate collection and management of data through programs such as the Atlantic Coastal Cooperative Statistics program and the Pacific Fisheries Information Network. The total increase in FY 2004 is $5 million. The initiative also focuses on the need for NOAA Fisheries to help improve its recordkeeping and reporting under fishery management regulations, as well as satisfy the Government Paperwork Elimination Act requirement to develop electronic options for federal reporting.

The initiative will increase the ability of the Agency to capture data needed to monitor and predict the impacts of current and proposed management actions. This will result in cost savings for the nation by taking advantage of economies of scale in the development of state trip ticket

systems across many fisheries at once in collaboration with multiple states, versus in isolation. In addition, the potential exists to eliminate some federal reporting systems if state trip ticket systems are developed that completely satisfy NOAA Fisheries needs, or NOAA Fisheries integrates multiple vessel trip report and dealer logbook requirements.

Vessel Monitoring System - This initiative will provide funding for the acquisition, implementation, and deployment of an additional 2,250 Vessel Monitoring System (VMS) units to effectively carry-out enforcement responsibilities with a direct ancillary benefit to Homeland Security initiatives. The initiative will substantially accelerate the deployment of VMS units within the nation's Fishery Management Plans. Included within this initiative are the following: (1) transceiver acquisition, installation; (2) expansion of the number of surveillance stations, satellite communications, and system maintenance; (3) expansion of VMS capabilities through research and development (hardware and software); and (4) an increase in the number of enforcement personnel (Enforcement Technicians and Special Agents) to support program expansion, monitor vessel activities and investigate incidents.

Although the use of VMS as an enforcement tool does not result in a direct cost savings to NOAA, it does provide a substantial benefit to our enforcement efforts and can be used to more efficiently direct the limited number of Coast Guard assets that we rely upon to support our enforcement efforts. The mapping of our oceans into various marine protected areas is clearly a significant aspect of future trends for the management and protection of our living marine resources. By leveraging this technology NMFS can provide far greater coverage and protection to these resources.

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STRATEGIC GOAL: SUSTAIN HEALTHY COASTS

The Programmatic Goal and Objectives: NOAA's goal to "Sustain Healthy Coasts" is based on the following supporting objectives: to protect, conserve, and restore coastal habitats and their biodiversity; to promote clean coastal waters to sustain living marine resources and ensure safe recreation, healthy seafood, and economic vitality; and to foster well-planned and revitalized coastal communities that sustain coastal economies, are compatible with the natural environment, minimize the risks from nature's hazards, and provide access to coastal resources for the public's use and enjoyment. The primary Line/Program Offices involved in this goal are NOS, OAR, NMFS, NESDIS, and the Coastal Ocean Program Office. In order to meet the objectives, investments in scientific and coastal resource management are required.

Information Technology Support: Information technologies have an increasingly important role in providing scientists and managers with tools to improve their ability to understand and manage our Nation's coastal resources. This goal, however, is not supported by any individual major systems. Most of the IT needs of the scientists and resource managers involved are satisfied by common computing, networking, and mid-level workstation equipment, and by commercially-available Geographic Information Systems (GIS), database management systems, statistical analysis, and related analytical software. The Internet and CD-ROMs also play important roles in disseminating information to coastal management users. Five of NOAA's Line and Program Offices have activities under this goal, with seventeen individual programs involved, and these IT resources are distributed throughout these organizations.

IT support is based mainly on PC, scientific workstation, and Internet resources. Primary IT needs for the future relate to model development, information sharing, and administration/management tools.

Much of the effort in meeting this goal's objectives involve resource management and protection supported by scientific research, monitoring, and assessment; scientific field and process studies and monitoring; information coordination; data management; archiving; and national-scale assessments. A need for grants administration, project management, and an information-sharing system to improve sustainable coastal communicates may be the focus of a future initiative. A seamless database of geo-referenced coastal information is needed to support the many NOAA efforts related to coastal environmental monitoring, assessment, management, and restoration.

Additional efforts may be directed toward developing new scientific processes to deal with harmful algal blooms and hypoxia, ensuring the proper use of science in coastal zone management decisions, developing restoration plans, and promoting coastal zone management activities such as habitat restoration and protection in the National Marine Sanctuaries and the National Estuarine Reserve System. Improving the ability to respond to natural and technological events including oil and chemical spills will require investments in integrated

local/Federal planning, improvement of scientific assessment tools, evaluating spill mitigation measures, and refining models used to estimate threats from spills and natural hazards.

Sustain Healthy Coasts IT Support Milestones	FY Goal
To be determined	

NOAA-WIDE INFRASTRUCTURE CAPABILITIES

NOAA has initiatives underway that serve NOAA as a whole. These are not directed at accomplishing any single strategic goal, but at providing the underlying infrastructure or improving the administrative services that allow NOAA to efficiently operate as a unified organization and to support collaboration and teamwork.

Future Investments:

Information Technology Security and Hardening NOAA's Critical Enterprise IT Systems and Infrastructure - NOAA's CIOs have concluded that additional investments need to be made in protecting NOAA's IT assets from a wide variety of threats.

NOAA has become increasingly dependent on IT to carry out almost every aspect of its mission. IT has allowed NOAA to provide more and better services to the public and to provide those services when the public wants them. Unfortunately increased usage and reliance on IT has also had the effect of introducing significant risks and vulnerabilities into NOAA's operations.

In response to these increased risks NOAA is planning for future investments for:

- N-CIRT Operations:
  - Initiate forensic database development/security help desk.
  - Install Intrusion Detection System in place across the national capital area and five additional major locations.
  - Establish N-CIRT backup server.
- Security Services:
  - Acquire High Speed Firewalls.
  - Establish Bioauthentication.
  - Establish and expand secure VPNs.
- Security Program Management:
  - Enhance NOAA Security Staff Support.
  - Security Planning Software.
- Security Training:
  - Provide specialized IT security training for network/system administrators and security staff.
  - Conduct security awareness training for all NOAA personnel.
  - Renew employee security awareness tutorial software.
- Security Assessments:
  - Increase the number of vulnerability assessments that NOAA can accomplish once every three years on its 30 critical asset systems.

In addition to IT security improvements, NOAA's CIOs recognize the need to harden NOAA's IT infrastructure. Hardening the NOAA-wide IT infrastructure will allow NOAA to continue performing its missions in the event that any segment becomes unavailable due to severe weather or natural disaster (hurricane, tornado or earthquake), technical failure (region-wide power failure), or a terrorist incident. Future investments are needed to provide the necessary enterprise-wide backup hardware, software and information systems to harden NOAA's critical IT infrastructure.

Hardening includes the processes and activities associated with the following:

- **NOAA-Wide Hardening NOAA's Enterprise IT Services**

  - **Hardened Network Infrastructure** (To Defend, Protect, Detect and React)
    - Provide diverse connections to all major NOAA facilities.
    - Remove single points of failure in campus networks.
    - Institute VPN service among campuses.
    - Implement a planned technology refresh program.
    - Provide backup for stand-alone operational systems.
    - Provide dedicated IT security support.
  - **Redundant Web Farms and Services** (To Defend, Protect, Restore and Update)
    - Move high priority Web sites to distributed, redundant, mirrored Web farms with full backup capability.
    - Provide Web masters with secure, reliable access to Web development environment with roll-back of updates and notification of failures.
    - Institute statistical analysis and management information system for Web sites.
    - Provide limited-access intranet services.
  - **Reliable Messaging** (To Defend and Protect)
    - Provide transparent fail-over service, augmented with more robust backup and recovery.
    - Remove single points of failure from directory system.
    - Provide secure login as the standard.
    - Provide optional secure (encrypted) e-mail.
  - **Advanced Authentication Capability** (To Defend and Protect)
    - Implement advanced authentication technologies for secure:
      - VPN authentication.
      - E-mail.
      - Remote administration.
      - Teleworking and support of a mobile workforce.

- **Centralized NOAA Help Desk with Backup for Operations and Recovery** (To Restore and Update)
  - 24x7 distributed operation.
  - Support for:
    - Networks and remote access.
    - Web services.
    - E-mail.
    - Provide NOAA-wide messaging (calling trees) to assist in recovery operations.

- **NOAA-Wide Consolidated Mass Storage Capability for NOAA File Systems** (To Protect, React, Restore and Update)

  - Consolidated mass storage capability for NOAA file systems:
    - Uniform requirements.
    - Scalable.
    - Efficient.
  - Provide centralized backup and restore capabilities in a secure environment and an off-site location with redundant capabilities.
  - Uniform requirements and procedures.
  - Efficient use of resources, elimination of duplicative efforts.

- **Improving Security of Mission Critical Satellite Data Processing Systems** (To Defend, Protect, Detect, React, Restore and Update)

  - Minimize and/or eliminate identified security vulnerabilities on the Central Environmental Satellite Computer System, the Satellite Data Distribution System, and the Data Collection System. Each of these systems provide critical satellite data, products and services to the National Weather Service, the Department of Defense, international forecasts centers, and the public and private sector. If any of these systems are attacked and breached by hackers, timely and valuable satellite data can be lost during a critical weather event, e.g., a hurricane approaching the East Coast, tornadic weather in the mid-West, or a volcanic eruption near a major airline flight path in Alaska.
  - Establish firewalls, intrusion detection software, proxy servers, virtual private networks, and user access security.
  - Utilize fault-tolerant and load-balancing technology to ensure system stability and reliability.
  - Apply scalable IT architecture currently configured to meet the NESDIS IT Target Architecture Plan.

- **Critical Financial and Administrative Systems Availability** (To Restore and Update)

  - Procure and install hardware, storage, and processing infrastructure necessary to restore these critical functions through automatic redundant capabilities designed as an integral part of OFA's daily operations..
  - Rapidly reestablish to full operational status to critical administrative systems, including payroll processing, contractor payments, funds disbursements to Treasury, and Grants disbursements, in order to ensure the integrity of NOAA's enterprise level operational capability.

It is estimated that the annual cost to deal with all of these IT hardening issues would exceed $20M. An initial annual investment of $5M is being planned and will focus hardened network infrastructure.

Budget Estimates ($K): Includes all hardware, software, operational, and support costs associated with the system. Also includes personnel costs for individuals whose primary task is system development, operations, or support. In accordance with the reporting format required by OMB, the budget estimates are divided into two categories: "development/enhancement" and "steady state". The first category is used for expenditures for developing a new IT system or enhancing an existing system. The second category is used for expenditures for just maintaining a current system.

System		FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
IT Security	Development/ enhancement		2,000					
	Steady state		2,000	4,000	4,000	4,000	4,000	4,000
IT Hardening	Development/ enhancement				5,000			
	Steady state					5,000	5,000	5,000

CONCLUSION

The contents of this plan have shown how NOAA's ability to maintain and improve its service to the Nation depends upon the wise and successful use of IT resources, and that NOAA is using technology both to re-engineer vital business processes and to significantly improve specific services. The plan has also shown that in a diverse agency like NOAA, a wide range of IT actions are needed; NOAA's challenge is to conduct this wide range of activities while maintaining sufficient coordination so that NOAA's IT systems work in an efficient and integrated way. IT is a tool, and it should now be clearer how the tools are to be used and for what purpose. The plan has provided both a comprehensive view of the critical systems and a means for achieving consensus about NOAA's future IT strategy. Management endorsement of this strategy provides direction for NOAA's future IT-related activities.

As stated in the Preface, this document is part of an annual planning and budgeting cycle. As NOAA's planning moves through the next steps in this cycle, and implementation actions start to be taken, there will be adjustments and changes in the plans. Within available resources, and considering changing needs, decisions will have to be made as to which programs and initiatives have the greater priority. These changes will be reflected in the subsequent IT planning activities – the NOAA Operational IT Plan and the supporting documentation for budget initiatives. The Strategic IT and Operational IT Plans, used in conjunction with NOAA's 5-Year Implementation Plans and NOAA Line and Program Office Operating Plans, provide a framework for future tracking of progress and measuring the accomplishments of IT systems. By preparing these plans and documenting the "return on investment" that NOAA is achieving through its IT systems, NOAA is working to implement the management approach mandated by the Government Performance and Results Act.

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ACRONYM LIST

AC	Anomaly Collation
ACE	Advanced Composition Explorer
AFOS	Automation of Field Operations and Services
AHPS	Advanced Hydrographic Prediction System
ASOS	Automated Surface Observing System
ATOVS	Advanced TIROS Operational Vertical Sounding
AVHRR	Advanced Very High Resolution Radiometer
AWG	Architecture Working Group
AWIPS	Advanced Weather Interactive Processing System
CAC	Computer-Assisted Compilation
CAMS	Commerce Administrative Management System
CEMSCS	Central Environmental Satellite Computer System
CDAS	Command and Data Acquisition Station
CFS	Core Financial System
CIO	Chief Information Officer
CIP	Critical Infrastructure Protection
CIRT	Computer Incident Response Team
COADS	Comprehensive Ocean-Atmosphere Data Set
COMPS	Customer Order Management Processing System (Data Centers)
CONOPS	Concept of Operations
CONUS	Continental United States
COOP	Continuity of Operations
CO-OPS	Center for Operational Oceanographic Products and Services
CORBA	Common Object Request Broker Architecture
CORMS	Continuous Operational Real-time Monitoring System
CORS	Continuously Operating Reference Stations
COTS	Commercial-off-the-shelf
CY	Calendar Year
DMSP	Defense Meteorological Satellite Program
DOA	Department of Agriculture
DOC	Department of Commerce
DOD	Department of Defense
DPAS	Data Processing and Analysis Subsystem (for NWLON)
E-Commerce	Electronic Commerce
ENSO	El Niño-Southern Oscillation
EOSDIS	Earth Observing System Data and Information System
EPA	Environmental Protection Agency

ERL	Environmental Research Laboratories
ESDIM	Environmental Services Data and Information Management
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FAA	Federal Aviation Administration
FBN	Federal Base Network
FEMA	Federal Emergency Management Agency
FIMA	Financial Management System
FIT	Fisheries Information Technology (Architecture)
FSL	Forecast Systems Laboratory
FTP	File Transport Protocol
GAO	General Accounting Office
GFDL	Geophysical Fluid Dynamics Laboratory
GIMTACS	GOES I-M Telemetry and Command System
GIS	Geographic Information System
GOES	Geostationary Operational Environmental Satellites
GPEA	Government Paperwork Elimination Act
GPRA	Government Performance and Results Act
GPS	Global Positioning System
GSA	General Services Administration
GSFC	Goddard Space Flight Center
GTACS	GOES Telemetry and Command System
HPC	High Performance Computing Capabilities
HPCC	High Performance Computing and Communications Program
HPCS	High Performance Computing System (FSL)
IBM	International Business Machines
IDS	Intruder Detection System
IJPS	Initial Joint Polar System
ISO	Information Systems Office (of Office of Finance and Administration)
IT	Information Technology
ITA	Information Technology Architecture
ITC	Information Technology Center (within the ISO)
JFMIP	Joint Financial Management Improvement Program
LAN	Local-Area-Network
LUTs	Local User Terminals
MEI	Minimum Essential Systems
METOP	Meteorological Operational satellite (EUMETSAT/ESA)
MPP	Massively-Parallel Processor
NAOS	North American Atmospheric Observing System
NARB	Network Advisory Review Board
NASA	National Aeronautics and Space Administration

NASIRC	NASA Automated Security Incident Response Capability
NCEP	National Centers for Environmental Prediction
NEDASS	National Environmental Data Archive and Access System
NESDIS	National Environmental Satellite, Data, and Information Service
NEXRAD	Next Generation Weather Radar
NFC	National Finance Center
NGS	National Geodetic Survey
NGSIDB	NGS Integrated Data Base System
NIC	Network Information Center
NMFS	National Marine Fisheries Service
NNDC	NOAA National Data Center
NNT	Nearest-Neighbor Tool
NOAA	National Oceanic and Atmospheric Administration
NOC	Network Operations Center
NOE	Network Operating Environment
NORC	NOAA Operations and Research Center
NOS	National Ocean Service
NPOESS	National Polar-orbiting Operational Environmental Satellite System
NSA	National Security Agency
NSRS	National Spatial Reference System
NSSL	National Severe Storms Laboratory
NSWIS	National Space Weather Information System
NSWP	National Space Weather Program
NTACS	GOES-N Telemetry, Acquisition, and Command Transmission Subsystem
NVDS	NOAA Virtual Data System
NWLON	National Water Level Observation Network
NWR	NOAA Weather Radio
NWS	National Weather Service
NWWS	NOAA Weather Wire Service
OAR	Office of Oceanic and Atmospheric Research
OFA	Office of Finance and Administration
OGE	Operations Ground Equipment
OMAO	Office of Marine and Aviation Operations
OMB	Office of Management and Budget
ORPG	Open Radar Product Generation (for NEXRAD)
OSTB	Office of Science and Technology Policy
PDD	Presidential Decision Directive
PIP	Product Improvement Program (for NEXRAD)
PMEL	Pacific Marine Environmental Laboratory
POES	Polar-orbiting Operational Environmental Satellites

PORTS	Physical Oceanographic Real-Time System
PPP	Point-to-Point Protocol
PUP	Principle User Processor (for NEXRAD)
RDA	Radar Data Acquisition
RFI	Request for Information
RFP	Request for Proposals
RPC	Rapid Prototyping Center
RPG	Radar Product Generation (for NEXRAD)
SAA	Satellite Active Archive
SARSAT	Search and Rescue Satellite-Aided Tracking
SATEPS	Satellite Environmental Processing System
SBN	Satellite Broadcast Network
SCARS	Super Computer-Assisted Revision System
SEC	Space Environment Center
SELDADS	Space Environment Laboratory Data Acquisition and Display System
SMS	Scalable Modeling System
SOCC	Satellite Operations Control Center
SRS	Scalable Runtime System
SST	Sea Surface Temperature
STARS	Standard Terminal Replacement System
TCP/IP	Transmission Control Protocol/Internet Protocol
USAF	United States Air Force
USCG	United States Coast Guard
USMCC	United States Mission Control Center
VA	Vulnerability Assessment
VPN	Virtual Private Network
WAN	Wide-Area-Network
WFO	Weather Forecast Office
WITS	Washington Interagency Telecommunications System
WSR	Weather Surveillance Radar
WWW	World-Wide-Web
Y2K	Year 2000